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An Advanced Information Presentation System

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Frank Jaff Norton Martin

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20. ABSTRACT (Continue on reverse side if necessary and identify by block number) This report describes the work performed in the second year of the three-year contract to explore the application of symbolic processing to command and control (C2); specifically, the graphics interface between the C2 user and a complex C2 decision support system. → next page		
In Volume I, the goals and approaches used in the design of the prototype system, AIPS (Advanced Information Presentation System), are discussed, as		

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well as the year's efforts to extend the prototype. An overview of the current AIPS system is also provided.

Volume II contains the complete AIPS knowledge base. This document provides the fully-inherited structure that the system sees during operation.

Volume III contains the programs that manipulate the knowledge base and provide the active behavioral component of the system.

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**APPLICATION OF SYMBOLIC PROCESSING
TO COMMAND AND CONTROL:**

AN ADVANCED INFORMATION PRESENTATION SYSTEM

Frank Zdybel, Jeff Gibbons, Norton Greenfeld and Martin Yonke

August 1981

**Annual Technical Report #2
Volume 2 - AIPS Knowledge Base**

Prepared by:

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1. CONCEPT INDEX

This volume contains the AIPS system knowledge base. It is printed here in full KL-ONE form, with all concepts having their complete inherited attribute structure visible. While there are only 233 concepts listed, it is clear from the size of this volume that the structure is complex. It is recommended that Volume One be used as a guide to the general structure of the knowledge base, and Volume Three (the program sources) be used as a final reference point to disambiguate any detailed questions raised by the first two volumes.

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2. THE KNOWLEDGE BASE

[1]

```
ROLE#66
  type: Individual
  individuates: ROLE, THING
  meta-describes:
    RoleSet Name    in Context AIPSDOMAINMETA
    is role value of (** IRole 1) of ENEMYNTDSSHIPIAPL1
```

[2]

```
ROLE#59
  type: Individual
  individuates: ROLE, THING
  meta-describes:
    RoleSet Name    in Context AIPSDOMAINMETA
    is role value of
      (** IRole 2) of FRIENDLYNTDSSUBIAPL1
```

[3]

```
ROLE#65
  type: Individual
  individuates: ROLE, THING
  meta-describes:
    RoleSet EngagementStatus    in Context AIPSDOMAINMETA
    is role value of
      (** IRole 193) of ENEMYNTDSSHIPIAPL1
```

[4]

```
ROLE#64
  type: Individual
  individuates: ROLE, THING
  meta-describes:
    RoleSet Position    in Context AIPSDOMAINMETA
    is role value of (** IRole 4) of ENEMYNTDSSHIPIAPL1
```

[5]

```
NTDSMAP
  type: Generic
  specializes: RECTANGULARMAP, MAP, DISPLAY,
               PRESENTATION, DISPLAYITEM, THING
  roles:
    (** ScaleUnit 2) ((ScaleUnit of RECTANGULARMAP))
```

```
ValDescs = (DISTANCEUNIT)
Number = 1
Modality = Optional
has attached IData:
  (DefaultFiller NIL)
    (CKLGetNamedConcept NM)
FriendlyShipSym ((Item of MAP),
  (Realization of PRESENTATION))
ValDescs = (FRIENDLYNTDSSHIP)
Number = (0 NIL)
Modality = Obligatory
has attached IData:
  (Derivation MakeMapItems)
    [(Prerequisites EntityList
      Application Ground)
     (Arguments
       (CKLFindNode $$CONCEPT
         Application)
       (CAR (CKLFindNode $$CONCEPT
         EntityList))
       (CAR (CKLFindNode $$CONCEPT
         Ground))
     )
    ]
  (FillWhenMade NIL)
  T
FriendlySubSym ((Item of MAP),
  (Realization of PRESENTATION))
ValDescs = (FRIENDLYNTDSSUB)
Number = (0 NIL)
Modality = Obligatory
FriendlyPlaneSym ((Item of MAP),
  (Realization of PRESENTATION))
ValDescs = (FRIENDLYNTDSPLANE)
Number = (0 NIL)
Modality = Obligatory
has attached IData:
  (Derivation MakeMapItems)
    [(Prerequisites EntityList
      Application Ground)
     (Arguments
       (CKLFindNode $$CONCEPT
         Application)
       (CAR (CKLFindNode $$CONCEPT
         EntityList))
       (CAR (CKLFindNode $$CONCEPT
         Ground))
     )
    ]
  (FillWhenMade NIL)
  T
EnemyShipSym ((Item of MAP),
  (Realization of PRESENTATION))
ValDescs = (ENEMYNTDSSHIP)
Number = (0 NIL)
```

```
Modality = Obligatory
has attached IData:
  (Derivation MakeMapItems)
    [(Prerequisites EntityList
                  Application Ground)
     (Arguments
      (CKLFindNode $$CONCEPT
                    Application)
      (CAR (CKLFindNode $$CONCEPT
                           EntityList))
      (CAR (CKLFindNode $$CONCEPT
                           Ground))
     (FillWhenMade NIL)
     T
    EnemySubSym ((Item of MAP),
                 (Realization of PRESENTATION))
    ValDescs = (ENEMYNTDSSUB)
    Number = (0 NIL)
    Modality = Obligatory
    has attached IData:
      (Derivation MakeMapItems)
        [(Prerequisites EntityList
                      Application Ground)
         (Arguments
          (CKLFindNode $$CONCEPT
                        Application)
          (CAR (CKLFindNode $$CONCEPT
                               EntityList))
          (CAR (CKLFindNode $$CONCEPT
                               Ground))
        (FillWhenMade NIL)
        T
      EnemyPlaneSym ((Item of MAP),
                     (Realization of PRESENTATION))
      ValDescs = (ENEMYNTDSPANE)
      Number = (0 NIL)
      Modality = Obligatory
      has attached IData:
        (Derivation MakeMapItems)
          [(Prerequisites EntityList
                        Application Ground)
           (Arguments
            (CKLFindNode $$CONCEPT
                          Application)
            (CAR (CKLFindNode $$CONCEPT
                                 EntityList))
            (CAR (CKLFindNode $$CONCEPT
                                 Ground))
          (FillWhenMade NIL)
          T
        UnknownShipSym ((Item of MAP),
```

```
          (Realization of PRESENTATION))
ValDescs = (UNKNOWNNTDSSHIP)
Number = (0 NIL)
Modality = Obligatory
UnknownSubSym ((Item of MAP),
               (Realization of PRESENTATION))
ValDescs = (UNKNOWNNTDSSUB)
Number = (0 NIL)
Modality = Obligatory
has attached IData:
(Derivation MakeMapItems)
  [(Prerequisites EntityList
                  Application Ground)
   (Arguments
     (CKLFindNode $$CONCEPT
                  Application)
     (CAR (CKLFindNode $$CONCEPT
                  EntityList))
     (CAR (CKLFindNode $$CONCEPT
                  Ground))
   (FillWhenMade NIL)
   T
UnknownPlaneSym ((Item of MAP),
                 (Realization of PRESENTATION))
ValDescs = (UNKNOWNNTDSPLANE)
Number = (0 NIL)
Modality = Obligatory
has attached IData:
(Derivation MakeMapItems)
  [(Prerequisites EntityList
                  Application Ground)
   (Arguments
     (CKLFindNode $$CONCEPT
                  Application)
     (CAR (CKLFindNode $$CONCEPT
                  EntityList))
     (CAR (CKLFindNode $$CONCEPT
                  Ground))
   (FillWhenMade NIL)
   T
((** DomainCoordSys 3) of RECTANGULARMAP) (
(DomainCoordSys of MAP))
  ValDescs = (CARTESIANSYSTEM)
  Number = 1
  Modality = Optional
  has attached IData:
    (Derivation FindDomainCoordinateSystem)
      [(Prerequisites EntityList)
       (Arguments
         (CAR (CKLFindNode $$CONCEPT
```

```
EntityList))
(KLFindVRsOfRole
(KLFindOneNamedGenericRole
$CONCEPT
(QUOTE DomainCoordSys)
(FillWhenMade NIL)
T
((** MapItemTransform 4) of RECTANGULARMAP) (
(MapItemTransform of MAP))
ValDescs = (2DLINEARTRANSFORM)
Number = 1
Modality = Obligatory
(ScaleDistance of RECTANGULARMAP)
ValDescs = (NUMBERP)
Number = 1
Modality = Optional
((** Border 4) of RECTANGULARMAP) ((Border of MAP),
(Realization of
PRESENTATION))
ValDescs = (RECTANGLE)
Number = 1
Modality = Optional
((** Ground 6) of RECTANGULARMAP) (
(Ground of DISPLAY))
ValDescs = (VIEWSURFACE)
Number = 1
Modality = Obligatory
has attached IData:
(Derivation Prerequisites)
(MapItemTransform)
(EntityList of MAP)
ValDescs = (LISTP)
Number = 1
Modality = Optional
((** Name 3) of MAP) ((Name of DISPLAY))
ValDescs = (STRINGP)
Number = 1
Modality = Obligatory
has attached IData:
(FillWhenMade NIL)
T
(Label of MAP) ((Realization of PRESENTATION))
ValDescs = (TEXT)
Number = 1
Modality = Optional
has attached IData:
(Derivation MakeMapLabel)
[(Prerequisites Name Ground)
(Arguments
```

```
(CAR (CKLFindNode $$CONCEPT
  Name))
  (CAR (CKLFindNode $$CONCEPT
  Ground]
(FillWhenMade NIL)
  T
(Legend of MAP) ((Realization of PRESENTATION))
  ValDescs = (MAPLEGEND)
  Number = 1
  Modality = Optional
  has attached IData:
    (Derivation MakeSimpleMapLegend)
      ((Prerequisites Name Item)
       (Arguments
         (CAR (CKLFindNode $$CONCEPT
           Name))
         (CKLFindNode $$CONCEPT Item)))
(FillWhenMade NIL)
  T
(ReferenceGrid of MAP) (
  (Realization of PRESENTATION))
  ValDescs = (MAPGRID)
  Number = 1
  Modality = Optional
(Item of MAP) ((Realization of PRESENTATION))
  ValDescs = (MAPITEM)
  Number = (1 NIL)
  Modality = Obligatory
  has attached IData:
    (Derivation MakeMapItems)
      [(Prerequisites EntityList
        Application Ground)
       (Arguments
         (CKLFindNode $$CONCEPT
           Application)
         (CAR (CKLFindNode $$CONCEPT
           EntityList)))
         (CAR (CKLFindNode $$CONCEPT
           Ground]
(FillWhenMade NIL)
  T
((** Realization 5) of DISPLAY) (
  (Realization of PRESENTATION))
  ValDescs = (DISPLAYITEM)
  Number = (0 NIL)
  Modality = Optional
(Application of PRESENTATION)
  ValDescs = (THING)
  Number = (0 NIL)
```

```

    Modality = Optional
  (Location of DISPLAYITEM)
    ValDescs = (LISTP)
    Number = 1
    Modality = Optional
    has attached IData:
      (DefaultFiller NIL)
        (LIST 0 0)
  (Size of DISPLAYITEM)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
    has attached IData:
      (DefaultFiller NIL)
        1
  (Orientation of DISPLAYITEM)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
  (Width of DISPLAYITEM)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
  (Height of DISPLAYITEM)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
  (Envelope of DISPLAYITEM)
    ValDescs = (CLOSEDCURVE)
    Number = 1
    Modality = Optional

```

[6]

```

NTDSITEMIAPL1
  type: Individual
  individuates: TEMPLATE, THING
  roles:
    (** IRole 194) ((ConceptGroup of TEMPLATE))
      ValDescs = (CONCEPT#29)
    (** IRole 195) ((ConceptGroup of TEMPLATE))
      ValDescs = (CONCEPT#30)
    (** IRole 196) ((ConceptGroup of TEMPLATE))
      ValDescs = (CONCEPT#31)
    (** IRole 197) ((RoleGroup of TEMPLATE))
      ValDescs = (ROLE#32)
    (** IRole 198) ((RoleGroup of TEMPLATE))
      ValDescs = (ROLE#33)
    (** IRole 199) ((RoleGroup of TEMPLATE))
      ValDescs = (ROLE#23)
    (** IRole 200) ((RoleGroup of TEMPLATE))
      ValDescs = (ROLE#34)

```

```
(** IRole 201) ((RoleGroup of TEMPLATE))
  ValDescs = (ROLE#35)
(** IRole 202) ((RoleGroup of TEMPLATE))
  ValDescs = (ROLE#36)
(** IRole 203) ((RoleGroup of TEMPLATE))
  ValDescs = (ROLE#37)
```

[7]

```
NTDSENGAGEMENTMARKIAPL1
  type: Individual
  individuates: TEMPLATE, THING
  roles:
    (** IRole 204) ((ConceptGroup of TEMPLATE))
    ValDescs = (CONCEPT#103)
    (** IRole 144) ((RoleGroup of TEMPLATE))
    ValDescs = (ROLE#100)
  is role value of
    (** IRole 205) of NTDSENGAGEMENTMARKABSTR,
      (** IRole 206) of
    NARROWNTDSENGAGEMENTMARKABSTR)
```

[8]

```
NTDSSTRENGTHMARK
  type: Generic
  specializes: THING
  is role value of (GroupStrengthMarker of NTDSITEM)
```

[9]

```
NTDSITEMABSTR
  type: Individual
  individuates: DISPLAYABSTRACTION,
    DISPLAYITEMABSTRACTION, ABSTRACTION,
    THING
  roles:
    (IntendedApplication of DISPLAYABSTRACTION)
    ValDescs = (TEMPLATE)
    Number = (1 NIL)
    Modality = Optional
    (InformationRequirement of DISPLAYABSTRACTION)
    ValDescs = (TEMPLATE)
    Number = (1 NIL)
    Modality = Optional
    (FixedComponent of DISPLAYITEMABSTRACTION)
    ValDescs = (DISPLAYFORM)
    Number = (1 NIL)
    Modality = Optional
```

[10]

```
NTDSVELOCITYLEADER
type: Generic
specializes: DISPLAY, PRESENTATION, DISPLAYITEM,
THING
has abstraction: NTDSVELOCITYLEADERABSTR
roles:
  Leader ((Realization of PRESENTATION))
    ValDescs = (LINESEGMENT)
    Number = (0 NIL)
    Modality = Obligatory
    has attached IData:
      (DefaultFiller NIL)
      (Make LINESEGMENT)
  (Ground of DISPLAY)
    ValDescs = (VIEWSURFACE)
    Number = 1
    Modality = Obligatory
  (Name of DISPLAY)
    ValDescs = (STRINGP)
    Number = 1
    Modality = Optional
  (Application of PRESENTATION)
    ValDescs = (THING)
    Number = (0 NIL)
    Modality = Optional
  (Location of DISPLAYITEM)
    ValDescs = (LISTP)
    Number = 1
    Modality = Optional
    has attached IData:
      (DefaultFiller NIL)
      (LIST 0 0)
  (Size of DISPLAYITEM)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
    has attached IData:
      (DefaultFiller NIL)
      1
  (Orientation of DISPLAYITEM)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
  (Width of DISPLAYITEM)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
  (Height of DISPLAYITEM)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
```

```
(Envelope of DISPLAYITEM)
  ValDescs = (CLOSEDCURVE)
  Number = 1
  Modality = Optional
is role value of (VelocityLeader of NTDSITEM)
has attached IData:
  (ToDraw NIL)  TDDisplay
  (ToLocate NIL)  TLDisplay TLDisplayItem
```

[11]

```
POINT#61
  type: Individual
  individuates: POINT, DISPLAYATOM, DISPLAYFORM,
                 DISPLAYITEM, THING
  roles:
    (** IRole 19) ((Location of DISPLAYITEM))
      ValDescs = ((0 0))
      has attached IData:
        (DefaultFiller NIL)
        (LIST 0 0)
  (Size of DISPLAYITEM)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
    has attached IData:
      (DefaultFiller NIL)
      1
  (Orientation of DISPLAYITEM)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
  (Width of DISPLAYITEM)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
  (Height of DISPLAYITEM)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
  (Envelope of DISPLAYITEM)
    ValDescs = (CLOSEDCURVE)
    Number = 1
    Modality = Optional
is role value of

  (** IRole 207) of ENEMYNTDSSHIPABSTR)
has attached IData:
  (ToDraw NIL)  TDPoint
  (ToErase NIL)  TEDisplayAtom
  (ToLocate NIL)  TLDisplayAtom TLDisplayItem
```

[12]

NARROWNTDSENGAGEMENTMARK
type: Generic
specializes: NTDSENGAGEMENTMARK, DISPLAY,
PRESENTATION, DISPLAYITEM, THING
has abstraction: NARROWNTDSENGAGEMENTMARKABSTR
roles:
 ((** Realization 5) of DISPLAY) (

(Realization of PRESENTATION)
 ValDescs = (DISPLAYITEM)
 Number = (0 NIL)
 Modality = Optional
(Ground of DISPLAY)
 ValDescs = (VIEWSURFACE)
 Number = 1
 Modality = Obligatory
(Name of DISPLAY)
 ValDescs = (STRINGP)
 Number = 1
 Modality = Optional
(Application of PRESENTATION)
 ValDescs = (THING)
 Number = (0 NIL)
 Modality = Optional
(Location of DISPLAYITEM)
 ValDescs = (LISTP)
 Number = 1
 Modality = Optional
 has attached IData:
 (DefaultFiller NIL)
 (LIST 0 0)
(Size of DISPLAYITEM)
 ValDescs = (NUMBERP)
 Number = 1
 Modality = Optional
 has attached IData:
 (DefaultFiller NIL)
 1
(Orientation of DISPLAYITEM)
 ValDescs = (NUMBERP)
 Number = 1
 Modality = Optional
(Width of DISPLAYITEM)
 ValDescs = (NUMBERP)
 Number = 1
 Modality = Optional
(Height of DISPLAYITEM)
 ValDescs = (NUMBERP)
 Number = 1
 Modality = Optional

```
(Envelope of DISPLAYITEM)
  ValDescs = (CLOSEDCURVE)
  Number = 1
  Modality = Optional
is role value of

(** EngagementMark 7) of UNKNOWNNTDSSHIP,
  (** EngagementMark 8) of UNKNOWNNTDSSUB

,
  (** EngagementMark 9) of
UNKNOWNNTDSPLANE)
has attached IData:
  (ToDraw NIL)  TDDisplay
  (ToLocate NIL) TLDisplay TLDisplayItem
```

[13]

```
EDGESET#60
type: Individual
individuates: EDGESET, DISPLAYATOM, DISPLAYFORM,
  DISPLAYITEM, THING
roles:
  (** IRole 208) ((VertexList of EDGESET))
  ValDescs = ((((-6 0) (0 6) (6 0) (0 -6) (-6 0)))
  (** IRole 22) ((Location of DISPLAYITEM))
  ValDescs = ((0 0))
has attached IData:
  (DefaultFiller NIL)
  (LIST 0 0)
(Size of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
has attached IData:
  (DefaultFiller NIL)
  1
(Orientation of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
(Width of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
(Height of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
(Envelope of DISPLAYITEM)
  ValDescs = (CLOSEDCURVE)
  Number = 1
  Modality = Optional
```

is role value of

((** IRole 23) of ENEMYNTDSSHIPABSTR)
has attached IData:
(ToErase NIL) TEDisplayAtom
(ToLocate NIL) TLDisplayAtom TLDisplayItem

[14]

POINT#54
type: Individual
individuates: POINT, DISPLAYATOM, DISPLAYFORM,
DISPLAYITEM, THING
roles:
(** IRole 209) ((Location of DISPLAYITEM))
ValDescs = ((0 0))
has attached IData:
(DefaultFiller NIL)
 (LIST 0 0)
(Size of DISPLAYITEM)
ValDescs = (NUMBERP)
Number = 1
Modality = Optional
has attached IData:
(DefaultFiller NIL)
 1
(Orientation of DISPLAYITEM)
ValDescs = (NUMBERP)
Number = 1
Modality = Optional
(Width of DISPLAYITEM)
ValDescs = (NUMBERP)
Number = 1
Modality = Optional
(Height of DISPLAYITEM)
ValDescs = (NUMBERP)
Number = 1
Modality = Optional
(Envelope of DISPLAYITEM)
ValDescs = (CLOSEDCURVE)
Number = 1
Modality = Optional
is role value of

((** IRole 210) of FRIENDLYNTDSSUBABSTR)
has attached IData:
(ToDraw NIL) TDPoint
(ToErase NIL) TEDisplayAtom
(ToLocate NIL) TLDisplayAtom TLDisplayItem

[15]

TEXTABSTR

```

type: Individual
individuates: DISPLAYABSTRACTION,
              DISPLAYITEMABSTRACTION, ABSTRACTION,
              THING
roles:
  (IntendedApplication of DISPLAYABSTRACTION)
    ValDescs = (TEMPLATE)
    Number = (1 NIL)
    Modality = Optional
  (InformationRequirement of DISPLAYABSTRACTION)
    ValDescs = (TEMPLATE)
    Number = (1 NIL)
    Modality = Optional.
  (FixedComponent of DISPLAYITEMABSTRACTION)
    ValDescs = (DISPLAYFORM)
    Number = (1 NIL)
    Modality = Optional

```

[16]

```

NTDSENGAGEMENTMARKABSTR
type: Individual
individuates: DISPLAYABSTRACTION,
              DISPLAYITEMABSTRACTION, ABSTRACTION,
              THING
has schema: NTDSENGAGEMENTMARK
roles:
  (** IRole 132) (
    (FixedComponent of DISPLAYITEMABSTRACTION))
    ValDescs = (LINESEGMENT#102)
  (** IRole 205) (
    (IntendedApplication of DISPLAYABSTRACTION))
    ValDescs = (NTDSENGAGEMENTMARKIAPL1)
    (InformationRequirement of DISPLAYABSTRACTION)
      ValDescs = (TEMPLATE)
      Number = (1 NIL)
      Modality = Optional

```

[17]

```

TEXT
type: Generic
specializes: DISPLAY, PRESENTATION, DISPLAYITEM,
              THING
roles:
  (** Realization 6) ((Realization of PRESENTATION))
    ValDescs = (DISPLAYITEM)
    Number = 0
    Modality = Optional
  String
    ValDescs = (STRINGP)

```

```
Number = 1
Modality = Obligatory
Font
  ValDescs = (THING)
  Number = 1
  Modality = Optional
LineSpacing
  ValDescs = (SMALLP)
  Number = 1
  Modality = Optional
(** Height 8) ((Height of DISPLAYITEM))
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
(** Width 7) ((Width of DISPLAYITEM))
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
(Ground of DISPLAY)
  ValDescs = (VIEWSURFACE)
  Number = 1
  Modality = Obligatory
(Name of DISPLAY)
  ValDescs = (STRINGP)
  Number = 1
  Modality = Optional
(Application of PRESENTATION)
  ValDescs = (THING)
  Number = (0 NIL)
  Modality = Optional
(Location of DISPLAYITEM)
  ValDescs = (LISTP)
  Number = 1
  Modality = Optional
  has attached IData:
    (DefaultFiller NIL)
      (LIST 0 0)
(Size of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
  has attached IData:
    (DefaultFiller NIL)
      1
(Orientation of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
(Envelope of DISPLAYITEM)
  ValDescs = (CLOSEDCURVE)
  Number = 1
```

```
  Modality = Optional
is role value of ((** Item 7) of TEXTROW),
  ((** Item 8) of TEXTCOLUMN),
  (Label of MAP),
  (Label of MAPITEM),
  (Label of MAPLEGEND),
  (ReferenceLabel of MAPGRID)
```

[18]

```
NTDSENGAGEMENTMARK
type: Generic
specializes: DISPLAY, PRESENTATION, DISPLAYITEM,
  THING
has specializer: NARROWNTDSENGAGEMENTMARK
has abstraction: NTDSENGAGEMENTMARKABSTR
roles:
  ((** Realization 5) of DISPLAY) (
    (Realization of PRESENTATION))
      ValDescs = (DISPLAYITEM)
      Number = (0 NIL)
      Modality = Optional
      (Ground of DISPLAY)
      ValDescs = (VIEWSURFACE)
      Number = 1
      Modality = Obligatory
      (Name of DISPLAY)
      ValDescs = (STRINGP)
      Number = 1
      Modality = Optional
      (Application of PRESENTATION)
      ValDescs = (THING)
      Number = (0 NIL)
      Modality = Optional
      (Location of DISPLAYITEM)
      ValDescs = (LISTP)
      Number = 1
      Modality = Optional
      has attached IData:
        (DefaultFiller NIL)
          (LIST 0 0)
      (Size of DISPLAYITEM)
      ValDescs = (NUMBERP)
      Number = 1
      Modality = Optional
      has attached IData:
        (DefaultFiller NIL)
          1
      (Orientation of DISPLAYITEM)
      ValDescs = (NUMBERP)
      Number = 1
```

```

    Modality = Optional
    (Width of DISPLAYITEM)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
    (Height of DISPLAYITEM)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
    (Envelope of DISPLAYITEM)
    ValDescs = (CLOSEDCURVE)
    Number = 1
    Modality = Optional
    is role value of (EngagementMark of NTDSITEM)
    has attached IData:
        (ToDraw NIL) TDDisplay
        (ToLocate NIL) TLDisplay TLDisplayItem

```

[19]

```

NARROWNTDSENGAGEMENTMARKABSTR
type: Individual
individuates: DISPLAYABSTRACTION,
              DISPLAYITEMABSTRACTION, ABSTRACTION,
              THING
has schema: NARROWNTDSENGAGEMENTMARK
roles:
    (** IRole 211) (
        (FixedComponent of DISPLAYITEMABSTRACTION))
        ValDescs = (LINESEGMENT#104)
    (** IRole 206) (
        (IntendedApplication of DISPLAYABSTRACTION))
        ValDescs = (NTDSENGAGEMENTMARKIAPL1)
    (InformationRequirement of DISPLAYABSTRACTION)
        ValDescs = (TEMPLATE)
        Number = (1 NIL)
        Modality = Optional

```

[20]

```

FRIENDLYNTDSSUBIAPL1
type: Individual
individuates: TEMPLATE, THING
roles:
    (** IRole 212) ((ConceptGroup of TEMPLATE))
        ValDescs = (CONCEPT#55)
    (** IRole 191) ((RoleGroup of TEMPLATE))
        ValDescs = (ROLE#56)
    (** IRole 213) ((RoleGroup of TEMPLATE))
        ValDescs = (ROLE#33)
    (** IRole 31) ((RoleGroup of TEMPLATE))

```

```

    ValDescs = (ROLE#57)
    (** IRole 214) ((RoleGroup of TEMPLATE))
    ValDescs = (ROLE#58)
    (** IRole 33) ((RoleGroup of TEMPLATE))
    ValDescs = (ROLE#35)
    (** IRole 215) ((RoleGroup of TEMPLATE))
    ValDescs = (ROLE#44)
    (** IRole 2) ((RoleGroup of TEMPLATE))
    ValDescs = (ROLE#59)
is role value of

((** IRole 216) of FRIENDLYNTDSSUBABSTR)

```

[21]

```

EDGESET#46
  type: Individual
  individuates: EDGESET, DISPLAYATOM, DISPLAYFORM,
                 DISPLAYITEM, THING
  roles:
    (** IRole 217) ((VertexList of EDGESET))
    ValDescs = (
      ((-6. 0.0) (-5.70634 1.8541) (-4.8541
      3.52671) (-3.52671 4.8541) (-1.8541 5.70634) (0.0 6.) (
      1.8541 5.70634) (3.52671 4.8541) (4.8541 3.52671) (5.70634
      1.8541) (6. 0.0)))
    (Location of DISPLAYITEM)
    ValDescs = (LISTP)
    Number = 1
    Modality = Optional
    has attached IData:
      (DefaultFiller NIL)
      (LIST 0 0)
    (Size of DISPLAYITEM)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
    has attached IData:
      (DefaultFiller NIL)
      1
    (Orientation of DISPLAYITEM)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
    (Width of DISPLAYITEM)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
    (Height of DISPLAYITEM)
    ValDescs = (NUMBERP)
    Number = 1

```

```
    Modality = Optional
    (Envelope of DISPLAYITEM)
    ValDescs = (CLOSEDCURVE)
    Number = 1
    Modality = Optional
is role value of

((** IRole 218) of FRIENDLYNTDSPLANEABSTR)
has attached IData:
    (ToErase NIL) TEDisplayAtom
    (ToLocate NIL) TLDisplayAtom TLDisplayItem
```

[22]

```
ROLE#52
type: Individual
individuates: ROLE, THING
meta-describes:
    RoleSet Name in Context AIPSDOMAINMETA
is role value of

((** IRole 219) of FRIENDLYNTDSPLANEIAPL1)
```

[23]

```
ROLE#53
type: Individual
individuates: ROLE, THING
meta-describes:
    RoleSet EngagementStatus in Context AIPSDOMAINMETA
is role value of
```

```
((** IRole 214) of FRIENDLYNTDSSUBIAPL1)
```

[24]

```
DEFAULT
type: Generic
specializes: THING
```

[25]

```
ROLE#51
type: Individual
individuates: ROLE, THING
meta-describes:
    RoleSet EngagementStatus in Context AIPSDOMAINMETA
is role value of
```

```
((** IRole 220) of FRIENDLYNTDSPLANEIAPL1)
```

[26]

ROLE#57

type: Individual
individuates: ROLE, THING
meta-describes:
 RoleSet Position in Context AIPSDOMAINMETA
is role value of
((** IRole 31) of FRIENDLYNTDSUBIAPL1)

[27]

DISPLAYITEMABSTRACTION

type: Generic
specializes: ABSTRACTION, THING
has specializer: DISPLAYABSTRACTION
has individuators: TEXTABSTR, MAPABSTR, MAPITEMABSTR,
NTDSITEMABSTR,
FRIENDLYNTDSSHIPABSTR,
FRIENDLYNTDSPLANEABSTR,
FRIENDLYNTDSSUBABSTR,
ENEMYNTDSSHIPABSTR,
ENEMYNTDSSUBABSTR,
ENEMYNTDSPLANEABSTR,
UNKNOWNNTDSSHIPABSTR,
UNKNOWNNTDSSUBABSTR,
UNKNOWNNTDSPLANEABSTR,
NTDSENGAGEMENTMARKABSTR,
NARROWNTDSENGAGEMENTMARKABSTR,
NTDSVELOCITYLEADERABSTR
roles:
 FixedComponent
 ValDescs = (DISPLAYFORM)
 Number = (1 NIL)
 Modality = Optional

[28]

ROLE#44

type: Individual
individuates: ROLE, THING
meta-describes:
 RoleSet Speed in Context AIPSDOMAINMETA
is role value of

((** IRole 221) of FRIENDLYNTDSSHIPIAPL1),
 (** IRole 222) of FRIENDLYNTDSPLANEIAPL1
, (** IRole 215) of FRIENDLYNTDSSUBIAPL1),
 (** IRole 223) of ENEMYNTDSSHIPIAPL1),
 (** IRole 43) of ENEMYNTDSSUBIAPL1),
 (** IRole 224) of ENEMYNTDSPLANEIAPL1),
 (** IRole 225) of UNKNOWNNTDSSHIPIAPL1),

```

((** IRole 175) of UNKNOWNNTDSSUBIAPL1),
((** IRole 172) of UNKNOWNNTDSPLANEIAPL1)

((** IRole 226) of
NTDSVELOCITYLEADERIAPL1)

```

[29]

```

ROLE#50
  type: Individual
  individuators: ROLE, THING
  meta-describes:
    RoleSet Position in Context AIPSDOMAINMETA
    is role value of

((** IRole 227) of FRIENDLYNTDSPLANEIAPL1)

```

[30]

```

DISPLAYABSTRACTION
  type: Generic
  specializes: DISPLAYITEMABSTRACTION, ABSTRACTION,
    THING
  has individuators: TEXTABSTR, MAPABSTR, MAPITEMABSTR,
    NTDSITEMABSTR,
    FRIENDLYNTDSSHIPABSTR,
    FRIENDLYNTDSPLANEABSTR,
    FRIENDLYNTDSSUBABSTR,
    ENEMYNTDSSHIPABSTR,
    ENEMYNTDSSUBABSTR,
    ENEMYNTDSPLANEABSTR,
    UNKNOWNNTDSSHIPABSTR,
    UNKNOWNNTDSSUBABSTR,
    UNKNOWNNTDSPLANEABSTR,
    NTDSENGAGEMENTMARKABSTR,
    NARROWNTDSENGAGEMENTMARKABSTR,
    NTDSVELOCITYLEADERABSTR

  roles:
    IntendedApplication
      ValDescs = (TEMPLATE)
      Number = (1 NIL)
      Modality = Optional
    InformationRequirement
      ValDescs = (TEMPLATE)
      Number = (1 NIL)
      Modality = Optional
    (FixedComponent of DISPLAYITEMABSTRACTION)
      ValDescs = (DISPLAYFORM)
      Number = (1 NIL)
      Modality = Optional

```

[31]

ROLE#49

type: Individual
individuates: ROLE, THING
meta-describes:
 RoleSet Ownership in Context AIPSDOMAINMETA
 is role value of
((** IRole 228) of FRIENDLYNTDSPLANEIAPL1)

[32]

CONCEPT#55

type: Individual
individuates: CONCEPT, THING
meta-describes:
 Concept FRIENDLYSUB in Context AIPSDOMAINMETA
 is role value of

((** IRole 212) of FRIENDLYNTDSSUBIAPL1)

[33]

TIME

type: Generic
specializes: THING
roles:
 Constraint
 ValDescs = (THING)
 Number = 1
 Modality = Optional
 Continuum
 ValDescs = (THING)
 Number = 1
 Modality = Optional

[34]

CONCEPT#48

type: Individual
individuates: CONCEPT, THING
meta-describes:
 Concept FRIENDLYPLANE in Context AIPSDOMAINMETA
 is role value of

((** IRole 229) of FRIENDLYNTDSPLANEIAPL1)

[35]

EDGESET#53

type: Individual
individuates: EDGESET, DISPLAYATOM, DISPLAYFORM,

```

        DISPLAYITEM, THING
roles:
  (** IRole 230) ((VertexList of EDGESET))
  ValDescs =
    ((-6. 0.0) (-5.70634 -1.8541) (-4.8541
-3.52671) (-3.52671 -4.8541) (-1.8541 -5.70634) (0.0 -6.) (
1.8541 -5.70634) (3.52671 -4.8541) (4.8541 -3.52671) (
5.70634 -1.8541) (6. 0.0)))
  (Location of DISPLAYITEM)
  ValDescs = (LISTP)
  Number = 1
  Modality = Optional
  has attached IData:
    (DefaultFiller NIL)
    (LIST 0 0)
  (Size of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
  has attached IData:
    (DefaultFiller NIL)
    1
  (Orientation of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
  (Width of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
  (Height of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
  (Envelope of DISPLAYITEM)
  ValDescs = (CLOSEDCURVE)
  Number = 1
  Modality = Optional
  is role value of

  (** IRole 231) of FRIENDLYNTDSSUBABSTR)
  has attached IData:
    (ToErase NIL) TEDisplayAtom
    (ToLocate NIL) TLDdisplayAtom TLDdisplayItem

```

[36]

```

POINT#47
  type: Individual
  individuates: POINT, DISPLAYATOM, DISPLAYFORM,
                 DISPLAYITEM, THING
  roles:

```

```
(** IRole 232) ((Location of DISPLAYITEM))
  ValDescs = ((0 0))
  has attached IData:
    (DefaultFiller NIL)
      (LIST 0 0)
(SIZE of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
  has attached IData:
    (DefaultFiller NIL)
      1
(ORIENTATION of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
(Width of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
(Height of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
(Envelope of DISPLAYITEM)
  ValDescs = (CLOSEDCURVE)
  Number = 1
  Modality = Optional
is role value of

((** IRole 233) of FRIENDLYNTDSPLANEABSTR)
  has attached IData:
    (ToDraw NIL)    TDPoint
    (ToErase NIL)   TEDisplayAtom
    (ToLocate NIL)  TLDisplayAtom TLDisplayItem
```

[37]

```
FRIENDLYNTDSSUB
  type: Generic
  specializes: NTDSITEM, MAPITEM, DISPLAY, PRESENTATION,
               DISPLAYITEM, THING
  roles:
    ((** Application 5) of NTDSITEM) (
      (Application of PRESENTATION))
      ValDescs = (THING)
      Number = (0 NIL)
      Modality = Optional
      has attached IData:
        (Derivation Consequents)
          (EngagementMark VelocityLeader
```

```
GroupStrengthMarker)
(VelocityLeader of NTDSITEM) (
(Realization of PRESENTATION)
  ValDescs = (NTDSVELOCITYLEADER)
  Number = 1
  Modality = Optional
(EngagementMark of NTDSITEM) (
(Realization of PRESENTATION)
  ValDescs = (NTDSENGAGEMENTMARK)
  Number = 1
  Modality = Optional
(GroupStrengthMarker of NTDSITEM) (
(Realization of PRESENTATION)
  ValDescs = (NTDSSTRENGTHMARK, DISPLAYITEM)
  Number = 1
  Modality = Optional
  has attached IData:
    (Derivation MakeNTDSGroupStrengthMark?)
      ((Prerequisites Application)
       (Arguments (CKLFindNode $$CONCEPT
                               Application)))
(Label of MAPITEM) ((Realization of PRESENTATION))
  ValDescs = (TEXT)
  Number = 1
  Modality = Optional
  has attached IData:
    (Derivation MakeMapItemLabel?)
      ((Prerequisites Application Ground)
       (Arguments
         (CAR (CKLFindNode $$CONCEPT
                               Application))
         (CAR (CKLFindNode $$CONCEPT
                               Ground)
             Ground)
       (FillWhenMade NIL)
       T
      (** Realization 7) of DISPLAY) (
(Realization of PRESENTATION)
  ValDescs = (DISPLAYITEM)
  Number = (0 NIL)
  Modality = Optional
(Ground of DISPLAY)
  ValDescs = (VIEWSURFACE)
  Number = 1
  Modality = Obligatory
(Name of DISPLAY)
  ValDescs = (STRINGP)
  Number = 1
```

```

Modality = Optional
(Location of DISPLAYITEM)
ValDescs = (LISTP)
Number = 1
Modality = Optional
has attached IData:
  (DefaultFiller NIL)
    (LIST 0 0)
(Size of DISPLAYITEM)
ValDescs = (NUMBERP)
Number = 1
Modality = Optional
has attached IData:
  (DefaultFiller NIL)
  1
(Orientation of DISPLAYITEM)
ValDescs = (NUMBERP)
Number = 1
Modality = Optional
(Width of DISPLAYITEM)
ValDescs = (NUMBERP)
Number = 1
Modality = Optional
(Height of DISPLAYITEM)
ValDescs = (NUMBERP)
Number = 1
Modality = Optional
(Envelope of DISPLAYITEM)
ValDescs = (CLOSEDCURVE)
Number = 1
Modality = Optional
is role value of (FriendlySubSym of NTDSMAP)
has attached IData:
  (ToDraw NIL) TDDisplay
  (ToLocate NIL) TLDisplay TLDisplayItem

```

[38]

```

VIEWSURFACE
type: Generic
specializes: RECTANGULARREGION, HOMOGENEOUSREGION,
  REGION, PLACE, THING
has specializers: DISPLAYSURFACE, VISIBLESURFACE,
  INVISIBLESURFACE
roles:
  Window
    ValDescs = (WINDOW)
    Number = (0 NIL)
    Modality = Optional
    (** Boundary 4) of RECTANGULARREGION) (
(Boundary of REGION), (Constraint of PLACE))

```

```

ValDescs = (RECTANGLE)
Number = 1
Modality = Obligatory
has attached IData:
(Derivation TMRectangle)
NIL
(** Continuum 5) of RECTANGULARREGION) (
(Continuum of PLACE))
ValDescs = (CARTESIANSYSTEM)
Number = 1
Modality = Optional
(** Height 9) of RECTANGULARREGION) (
(Height of REGION))
ValDescs = (NUMBERP)
Number = 1
Modality = Optional
has attached IData:
(Derivation Copy)
  [(Prerequisites Boundary)
   (Arguments
    (CAR (CKLFindNode $$CONCEPT
                           Boundary
                           Height)
        (Width 8) of RECTANGULARREGION) (
(Width of REGION))
ValDescs = (NUMBERP)
Number = 1
Modality = Optional
(** Aperture 3) of HOMOGENEOUSREGION) (
(Aperture of REGION), (Constraint of PLACE))
ValDescs = (REGION)
Number = 0
Modality = Optional
(Constraint of PLACE)
ValDescs = (THING)
Number = 1
Modality = Optional
is role value of (Ground of DISPLAY)
has attached IData:
(ToSize NIL)  TSRectangularRegion

```

[39]

```

DISPLAYITEM
type: Generic
specializes: THING
has specializers: DISPLAYFORM, DISPLAY,
MOTILEDISPLAYITEM,

```

STABILEDISPLAYITEM, DISPLAYATOM,
DISPLAYCOMPOSITE, TEXT, ARRANGEMENT,
MAP, MAPITEM, MAPGRID,
NTDSENGAGEMENTMARK,
NTDSVELOCITYLEADER, POINT, EDGESET,
CURVE, ROW, COLUMN, TABLE,
MAPLEGEND, RECTANGULARMAP,
MAPWITHBACKGROUND, NTDSITEM,
NARROWNTDSENGAGEMENTMARK,
LINESEGMENT, CLOSEDCURVE, TEXTROW,
TEXTCOLUMN, ROWTABLE, COLUMNTABLE,
NTDSMAP, FRIENDLYNTDSSHIP,
FRIENDLYNTDSPLANE, FRIENDLYNTDSSUB,
ENEMYNTDSSHIP, ENEMYNTDSSUB,
ENEMYNTDSPLANE, UNKNOWNNTDSSHIP,
UNKNOWNNTDSSUB, UNKNOWNNTDSPLANE,
ELLIPSE, POLYGON, CIRCLE,
REGULARPOLYGON, RECTANGLE
has individuators: POINT#39, POINT#47, POINT#54,
POINT#61, POINT#68, POINT#75,
POINT#82, POINT#89, POINT#96,
EDGESET#46, EDGESET#53, EDGESET#60,
EDGESET#67, EDGESET#74, EDGESET#81,
EDGESET#88, EDGESET#95,
LINESEGMENT#26, LINESEGMENT#27,
LINESEGMENT#102, LINESEGMENT#104,
CIRCLE#38
roles:
Location
 ValDescs = (LISTP)
 Number = 1
 Modality = Optional
 has attached IData:
 (DefaultFiller NIL)
 (List 0 0)
Size
 ValDescs = (NUMBERP)
 Number = 1
 Modality = Optional
 has attached IData:
 (DefaultFiller NIL)
 1
Orientation
 ValDescs = (NUMBERP)
 Number = 1
 Modality = Optional
Width
 ValDescs = (NUMBERP)
 Number = 1
 Modality = Optional
Height

```

ValDescs = (NUMBERP)
Number = 1
Modality = Optional
Envelope
ValDescs = (CLOSEDCURVE)
Number = 1
Modality = Optional
is role value of ((** Realization 7) of DISPLAY),
(Separator of ARRANGEMENT)
has attached IData:
(ToLocate NIL) TLDisplayItem

```

[40]

```

FRIENDLYNTDSSUBABSTR
type: Individual
individuates: DISPLAYABSTRACTION,
DISPLAYITEMABSTRACTION, ABSTRACTION,
THING
has schema: FRIENDLYNTDSSUB
roles:
(** IRole 216) (
(IntendedApplication of DISPLAYABSTRACTION))
ValDescs = (FRIENDLYNTDSSUBIAPI1)
(** IRole 231) (
(FixedComponent of DISPLAYITEMABSTRACTION))
ValDescs = (EDGESET#53)
(** IRole 210) (
(FixedComponent of DISPLAYITEMABSTRACTION))
ValDescs = (POINT#54)
(InformationRequirement of DISPLAYABSTRACTION)
ValDescs = (TEMPLATE)
Number = (1 NIL)
Modality = Optional

```

[41]

```

FRIENDLYNTDSPLANEIAPI1
type: Individual
individuates: TEMPLATE, THING
roles:
(** IRole 229) ((ConceptGroup of TEMPLATE))
ValDescs = (CONCEPT#48)
(** IRole 228) ((RoleGroup of TEMPLATE))
ValDescs = (ROLE#49)
(** IRole 234) ((RoleGroup of TEMPLATE))
ValDescs = (ROLE#33)
(** IRole 227) ((RoleGroup of TEMPLATE))
ValDescs = (ROLE#50)
(** IRole 220) ((RoleGroup of TEMPLATE))

```

```
    ValDescs = (ROLE#51)
(** IRole 235) ((RoleGroup of TEMPLATE))
    ValDescs = (ROLE#35)
(** IRole 222) ((RoleGroup of TEMPLATE))
    ValDescs = (ROLE#44)
(** IRole 236) ((RoleGroup of TEMPLATE))
    ValDescs = (ROLE#52)
is role value of
(** IRole 237) of FRIENDLYNTDSPLANEABSTR)
```

[42]

```
FRIENDLYNTDSSHIPIAPL1
type: Individual
individuates: TEMPLATE, THING
roles:
    (** IRole 238) ((ConceptGroup of TEMPLATE))
    ValDescs = (CONCEPT#40)
    (** IRole 239) ((RoleGroup of TEMPLATE))
    ValDescs = (ROLE#41)
    (** IRole 240) ((RoleGroup of TEMPLATE))
    ValDescs = (ROLE#33)
    (** IRole 241) ((RoleGroup of TEMPLATE))
    ValDescs = (ROLE#42)
    (** IRole 242) ((RoleGroup of TEMPLATE))
    ValDescs = (ROLE#43)
    (** IRole 243) ((RoleGroup of TEMPLATE))
    ValDescs = (ROLE#35)
    (** IRole 221) ((RoleGroup of TEMPLATE))
    ValDescs = (ROLE#44)
    (** IRole 244) ((RoleGroup of TEMPLATE))
    ValDescs = (ROLE#45)
is role value of
(** IRole 245) of FRIENDLYNTDSSHIPABSTR)
```

[43]

```
ITEMPLATE
type: Generic
specializes: TEMPLATE, THING
roles:
    (** ConceptGroup 3) ((ConceptGroup of TEMPLATE))
    ValDescs = (ICONCEPT, CONCEPT)
    Number = (0 NIL)
    Modality = Optional
    (RoleGroup of TEMPLATE)
    ValDescs = (ROLE)
    Number = (1 NIL)
    Modality = Obligatory
```

is role value of (Application of PRESENTATION)

[44]

PLACE

type: Generic

specializes: THING

has specializers: POSITION, REGION, HOMOGENEOUSREGION,
RECTANGULARREGION, VIEWSURFACE,
DISPLAYSURFACE, VISIBLESURFACE,
INVISIBLESURFACE

roles:

Constraint

ValDescs = (THING)

Number = 1

Modality = Optional

Continuum

ValDescs = (COORDINATESYSTEM)

Number = 1

Modality = Optional

is role value of (Position of PHYSOBJECT)

[45]

PRESENTATION

type: Generic

specializes: THING

has specializers: DISPLAY, TEXT, ARRANGEMENT, MAP,
MAPITEM, MAPGRID,
NTDSENGAGEMENTMARK,
NTDSVELOCITYLEADER, ROW, COLUMN,
TABLE, MAPLEGEND, RECTANGULARMAP,
MAPWITHBACKGROUND, NTDSITEM,
NARROWNTDSENGAGEMENTMARK, TEXTROW,
TEXTCOLUMN, ROWTABLE, COLUMNTABLE,
NTDSMAP, FRIENDLYNTDSSHIP,
FRIENDLYNTDSPLANE, FRIENDLYNTDSSUB,
ENEMYNTDSSHIP, ENEMYNTDSSUB,
ENEMYNTDSPLANE, UNKNOWNNTDSSHIP,
UNKNOWNNTDSSUB, UNKNOWNNTDSPLANE

roles:

Application

ValDescs = (THING)

Number = (0 NIL)

Modality = Optional

Realization

ValDescs = (THING)

Number = (0 NIL)

Modality = Optional

[46]

CIRCLE
type: Generic
specializes: ELLIPSE, CLOSEDCURVE, CURVE, DISPLAYATOM,
DISPLAYFORM, DISPLAYITEM, THING
has individuator: CIRCLE#38
roles:
 Radius ((SemiMinorAxis of ELLIPSE),
 (SemiMajorAxis of ELLIPSE),
 (Size of DISPLAYITEM))
 ValDescs = (NUMBERP)
 Number = 1
 Modality = Obligatory
 has attached IData:
 (DefaultFiller NIL)
 1
 (Center of ELLIPSE) ((Location of DISPLAYITEM))
 ValDescs = (LISTP)
 Number = 1
 Modality = Optional
 has attached IData:
 (DefaultFiller NIL)
 1
 (List 0 0)
 (Approximation of CURVE)
 ValDescs = (EDGESET)
 Number = 1
 Modality = Optional
 (Size of DISPLAYITEM)
 ValDescs = (NUMBERP)
 Number = 1
 Modality = Optional
 has attached IData:
 (DefaultFiller NIL)
 1
 (Orientation of DISPLAYITEM)
 ValDescs = (NUMBERP)
 Number = 1
 Modality = Optional
 (Width of DISPLAYITEM)
 ValDescs = (NUMBERP)
 Number = 1
 Modality = Optional
 (Height of DISPLAYITEM)
 ValDescs = (NUMBERP)
 Number = 1
 Modality = Optional
 (Envelope of DISPLAYITEM)
 ValDescs = (CLOSEDCURVE)
 Number = 1
 Modality = Optional

[47]

```

ENEMYNTDSSUBIAPL1
type: Individual
individuates: TEMPLATE, THING
roles:
  (** IRole 68) ((ConceptGroup of TEMPLATE))
  ValDescs = (CONCEPT#69)
  (** IRole 181) ((RoleGroup of TEMPLATE))
  ValDescs = (ROLE#70)
  (** IRole 70) ((RoleGroup of TEMPLATE))
  ValDescs = (ROLE#33)
  (** IRole 190) ((RoleGroup of TEMPLATE))
  ValDescs = (ROLE#71)
  (** IRole 72) ((RoleGroup of TEMPLATE))
  ValDescs = (ROLE#72)
  (** IRole 246) ((RoleGroup of TEMPLATE))
  ValDescs = (ROLE#35)
  (** IRole 43) ((RoleGroup of TEMPLATE))
  ValDescs = (ROLE#44)
  (** IRole 169) ((RoleGroup of TEMPLATE))
  ValDescs = (ROLE#73)
is role value of (** IRole 75) of ENEMYNTDSSUBABSTR)

```

[48]

```

ROLE#42
type: Individual
individuates: ROLE, THING
meta-describes:
  RoleSet Position in Context AIPSDOMAINMETA
is role value of
(** IRole 241) of FRIENDLYNTDSSHIPAPIAPL1)

```

[49]

```

ABSTRACTION
type: Generic
specializes: THING
has specializers: DISPLAYITEMABSTRACTION,
                  DISPLAYABSTRACTION
has individuators: TEXTABSTR, MAPABSTR, MAPITEMABSTR,
                   NTDSITEMABSTR,
                   FRIENDLYNTDSSHIPABSTR,
                   FRIENDLYNTDSSPLANEABSTR,
                   FRIENDLYNTDSSUBABSTR,
                   ENEMYNTDSSHIPABSTR,
                   ENEMYNTDSSUBABSTR,
                   ENEMYNTDSSPLANEABSTR,
                   UNKNOWNNTDSSHIPABSTR,
                   UNKNOWNNTDSSUBABSTR,
                   UNKNOWNNTDSSPLANEABSTR,

```

NTDSENGAGEMENTMARKABSTR,
NARROWNTDSENGAGEMENTMARKABSTR,
NTDSVELOCITYLEADERABSTR

[50]

FRIENDLYNTDSSHIPABSTR
type: Individual
individuates: DISPLAYABSTRACTION,
DISPLAYITEMABSTRACTION, ABSTRACTION,
THING
roles:
(** IRole 245) (

(IntendedApplication of DISPLAYABSTRACTION)
ValDescs = (FRIENDLYNTDSSHIPIAPL)
(** IRole 247) (

(FixedComponent of DISPLAYITEMABSTRACTION)
ValDescs = (CIRCLE#38)
(** IRole 248) (

(FixedComponent of DISPLAYITEMABSTRACTION)
ValDescs = (POINT#39)
(InformationRequirement of DISPLAYABSTRACTION)
ValDescs = (TEMPLATE)
Number = (1 NIL)
Modality = Optional

[51]

FRIENDLYNTDSSHIP
type: Generic
specializes: NTDSITEM, MAPITEM, DISPLAY, PRESENTATION,
DISPLAYITEM, THING
roles:
((** Application 5) of NTDSITEM) (

(Application of PRESENTATION)
ValDescs = (THING)
Number = (0 NIL)
Modality = Optional
has attached IData:
(Derivation Consequents)
(EngagementMark VelocityLeader
GroupStrengthMarker)
(VelocityLeader of NTDSITEM) (

(Realization of PRESENTATION)
ValDescs = (NTDSVELOCITYLEADER)
Number = 1
Modality = Optional

```
(EngagementMark of NTDSITEM) (
  (Realization of PRESENTATION)
    ValDescs = (NTDSENGAGEMENTMARK)
    Number = 1
    Modality = Optional
  (GroupStrengthMarker of NTDSITEM) (
    (Realization of PRESENTATION)
      ValDescs = (NTDSSTRENGTHMARK, DISPLAYITEM)
      Number = 1
      Modality = Optional
      has attached IData:
        (Derivation MakeNTDSGroupStrengthMark?)
          ((Prerequisites Application)
            (Arguments (CKLFindNode $$CONCEPT
                        Application)))
    (Label of MAPITEM) ((Realization of PRESENTATION))
      ValDescs = (TEXT)
      Number = 1
      Modality = Optional
      has attached IData:
        (Derivation MakeMapItemLabel?)
          [(Prerequisites Application Ground)
            (Arguments
              (CAR (CKLFindNode $$CONCEPT
                                Application))
              (CAR (CKLFindNode $$CONCEPT
                                Ground))
            )
          ]
      (FillWhenMade NIL)
      T
    (** Realization 8) of DISPLAY) (
      (Realization of PRESENTATION)
        ValDescs = (DISPLAYITEM)
        Number = (0 NIL)
        Modality = Optional
      (Ground of DISPLAY)
        ValDescs = (VIEWSURFACE)
        Number = 1
        Modality = Obligatory
      (Name of DISPLAY)
        ValDescs = (STRINGP)
        Number = 1
        Modality = Optional
      (Location of DISPLAYITEM)
        ValDescs = (LISTP)
        Number = 1
        Modality = Optional
        has attached IData:
          (DefaultFiller NIL)
```

```
(LIST 0 0)
(Size of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
  has attached IData:
    (DefaultFiller NIL)
    1
(Orientation of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
(Width of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
(Height of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
(Envelope of DISPLAYITEM)
  ValDescs = (CLOSEDCURVE)
  Number = 1
  Modality = Optional
  is role value of (FriendlyShipSym of NTDSMAP)
  has attached IData:
    (ToDraw NIL) TDDisplay
    (ToLocate NIL) TLDisplay TLDisplayItem
```

[52]

```
CONCEPT#40
  type: Individual
  individuates: CONCEPT, THING
  meta-describes:
    Concept FRIENDLYSHIP in Context AIPSDOMAINMETA
  is role value of
  ((** IRole 238) of FRIENDLYNTDSSHIPIAPL1)
```

[53]

```
ROLE#45
  type: Individual
  individuates: ROLE, THING
  meta-describes:
    RoleSet Name in Context AIPSDOMAINMETA
  is role value of
  ((** IRole 244) of FRIENDLYNTDSSHIPIAPL1)
```

[54]

```

FRIENDLYNTDSPLANEABSTR
  type: Individual
  individuates: DISPLAYABSTRACTION,
                 DISPLAYITEMABSTRACTION, ABSTRACTION,
                 THING
  roles:
    (** IRole 237) (
      (IntendedApplication of DISPLAYABSTRACTION)
        ValDescs = (FRIENDLYNTDSPLANEIAPL1)
        (** IRole 218) (
          (FixedComponent of DISPLAYITEMABSTRACTION)
            ValDescs = (EDGESET#46)
            (** IRole 233) (
              (FixedComponent of DISPLAYITEMABSTRACTION)
                ValDescs = (POINT#47)
                (InformationRequirement of DISPLAYABSTRACTION)
                  ValDescs = (TEMPLATE)
                  Number = (1 NIL)
                  Modality = Optional

```

[55]

```

FRIENDLYNTDSPLANE
  type: Generic
  specializes: NTDSITEM, MAPITEM, DISPLAY, PRESENTATION,
                DISPLAYITEM, THING
  roles:
    ((** Application 5) of NTDSITEM) (
      (Application of PRESENTATION)
        ValDescs = (THING)
        Number = (0 NIL)
        Modality = Optional
        has attached IData:
          (Derivation Consequents)
            (EngagementMark VelocityLeader
             GroupStrengthMarker)
      (VelocityLeader of NTDSITEM) (
        (Realization of PRESENTATION)
          ValDescs = (NTDSVELOCITYLEADER)
          Number = 1
          Modality = Optional
        (EngagementMark of NTDSITEM) (
          (Realization of PRESENTATION)
            ValDescs = (NTDSENGAGEMENTMARK)
            Number = 1

```

```
  Modality = Optional
  (GroupStrengthMarker of NTDSITEM)  (
    (Realization of PRESENTATION)
      ValDescs = (NTDSSTRENGTHMARK, DISPLAYITEM)
      Number = 1
      Modality = Optional
      has attached IData:
        (Derivation MakeNTDSGroupStrengthMark?)
          ((Prerequisites Application)
            (Arguments (CKLFindNode $$CONCEPT
              Application)))
    (Label of MAPITEM) ((Realization of PRESENTATION))
      ValDescs = (TEXT)
      Number = 1
      Modality = Optional
      has attached IData:
        (Derivation MakeMapItemLabel?)
          ((Prerequisites Application Ground)
            (Arguments
              (CAR (CKLFindNode $$CONCEPT
                Application))
              (CAR (CKLFindNode $$CONCEPT
                Ground)
                (FillWhenMade NIL)
                T
              (** Realization 8) of DISPLAY) (
                (Realization of PRESENTATION)
                  ValDescs = (DISPLAYITEM)
                  Number = (0 NIL)
                  Modality = Optional
                (Ground of DISPLAY)
                  ValDescs = (VIEWSURFACE)
                  Number = 1
                  Modality = Obligatory
                (Name of DISPLAY)
                  ValDescs = (STRINGP)
                  Number = 1
                  Modality = Optional
                (Location of DISPLAYITEM)
                  ValDescs = (LISTP)
                  Number = 1
                  Modality = Optional
                  has attached IData:
                    (DefaultFiller NIL)
                    (LIST 0 0)
                (Size of DISPLAYITEM)
                  ValDescs = (NUMBERP)
                  Number = 1
                  Modality = Optional
```

```

has attached IData:
  (DefaultFiller NIL)
    1
(Orientation of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
(Width of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
(Height of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
(Envelope of DISPLAYITEM)
  ValDescs = (CLOSEDCURVE)
  Number = 1
  Modality = Optional
is role value of (FriendlyPlaneSym of NTDSMAP)

```

[56]

```

ENEMYNTDSSHIPAPI
type: Individual
individuates: TEMPLATE, THING
roles:
  (** IRole 78) ((ConceptGroup of TEMPLATE))
    ValDescs = (CONCEPT#62)
  (** IRole 79) ((RoleGroup of TEMPLATE))
    ValDescs = (ROLE#63)
  (** IRole 80) ((RoleGroup of TEMPLATE))
    ValDescs = (ROLE#33)
  (** IRole 4) ((RoleGroup of TEMPLATE))
    ValDescs = (ROLE#64)
  (** IRole 249) ((RoleGroup of TEMPLATE))
    ValDescs = (ROLE#65)
  (** IRole 82) ((RoleGroup of TEMPLATE))
    ValDescs = (ROLE#35)
  (** IRole 223) ((RoleGroup of TEMPLATE))
    ValDescs = (ROLE#44)
  (** IRole 1) ((RoleGroup of TEMPLATE))
    ValDescs = (ROLE#66)
is role value of
  (** IRole 250) of ENEMYNTDSSHIPABSTR)

```

[57]

```

ROLE#43
type: Individual

```

```

individuates: ROLE, THING
meta-describes:
  RoleSet EngagementStatus in Context AIPSDOMAINMETA
  is role value of
  (** IRole 242) of FRIENDLYNTDSSHIPIAPL1)

```

[58]

```

ENEMYNTDSSUBABSTR
  type: Individual
  individuates: DISPLAYABSTRACTION,
  DISPLAYITEMABSTRACTION, ABSTRACTION,
  THING
  has schema: ENEMYNTDSSUB
  roles:
    (** IRole 75) (
      (IntendedApplication of DISPLAYABSTRACTION)
        ValDescs = (ENEMYNTDSSUBIAPL1)
      (** IRole 84) (
        (FixedComponent of DISPLAYITEMABSTRACTION)
          ValDescs = (EDGESET#67)
        (** IRole 85) (
          (FixedComponent of DISPLAYITEMABSTRACTION)
            ValDescs = (POINT#68)
            (InformationRequirement of DISPLAYABSTRACTION)
              ValDescs = (TEMPLATE)
              Number = (1 NIL)
              Modality = Optional

```

[59]

```

ROLE#36
  type: Individual
  individuates: ROLE, THING
  meta-describes:
    RoleSet Speed in Context AIPSDOMAINMETA
    is role value of (** IRole 251) of NTDSITEMIAPL1)

```

[60]

```

ENEMYNTDSSUB
  type: Generic
  specializes: NTDSITEM, MAPITEM, DISPLAY, PRESENTATION,
  DISPLAYITEM, THING
  has abstraction: ENEMYNTDSSUBABSTR
  roles:
    (** Application 5) of NTDSITEM) (

```

```
(Application of PRESENTATION))
  ValDescs = (THING)
  Number = (0 NIL)
  Modality = Optional
  has attached IData:
    (Derivation Consequents)
      (EngagementMark VelocityLeader
        GroupStrengthMarker)
  (VelocityLeader of NTDSITEM) (


(Realization of PRESENTATION))
  ValDescs = (NTDSVELOCITYLEADER)
  Number = 1
  Modality = Optional
  (EngagementMark of NTDSITEM) (


(Realization of PRESENTATION))
  ValDescs = (NTDSENGAGEMENTMARK)
  Number = 1
  Modality = Optional
  (GroupStrengthMarker of NTDSITEM) (


(Realization of PRESENTATION))
  ValDescs = (NTDSSTRENGTHMARK, DISPLAYITEM)
  Number = 1
  Modality = Optional
  has attached IData:
    (Derivation MakeNTDSGroupStrengthMark?)
      ((Prerequisites Application)
        (Arguments (CKLFindNode $$CONCEPT
          Application)))
  (Label of MAPITEM) ((Realization of PRESENTATION))
    ValDescs = (TEXT)
    Number = 1
    Modality = Optional
    has attached IData:
      (Derivation MakeMapItemLabel?)
        [(Prerequisites Application Ground)
          (Arguments
            (CAR (CKLFindNode $$CONCEPT
              Application))
            (CAR (CKLFindNode $$CONCEPT
              Ground))
        (FillWhenMade NIL)
        T
  (** Realization 8) of DISPLAY) (


(Realization of PRESENTATION))
  ValDescs = (DISPLAYITEM)
  Number = (0 NIL)
  Modality = Optional
```

```
(Ground of DISPLAY)
  ValDescs = (VIEWSURFACE)
  Number = 1
  Modality = Obligatory
(NAME of DISPLAY)
  ValDescs = (STRINGP)
  Number = 1
  Modality = Optional
(LOCATION of DISPLAYITEM)
  ValDescs = (LISTP)
  Number = 1
  Modality = Optional
  has attached IData:
    (DefaultFiller NIL)
      (LIST 0 0)
(SIZE of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
  has attached IData:
    (DefaultFiller NIL)
      1
(ORIENTATION of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
(Width of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
(Height of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
(Envelope of DISPLAYITEM)
  ValDescs = (CLOSEDCURVE)
  Number = 1
  Modality = Optional
is role value of (EnemySubSym of NTDSMAP)
has attached IData:
  (ToDraw NIL) TDDisplay
  (ToLocate NIL) TLDdisplay TLDdisplayItem
```

[61]

```
ROLE#41
  type: Individual
  individuates: ROLE, THING
  meta-describes:
    RoleSet Ownership in Context AIPSDOMAINMETA
  is role value of
```

((** IRole 239) of FRIENDLYNTDSSHIPIAPL1)

[62]

```
ENEMYNTDSSHIPABSTR
  type: Individual
  individuates: DISPLAYABSTRACTION,
                 DISPLAYITEMABSTRACTION, ABSTRACTION,
                 THING
  has schema: ENEMYNTDSSHIP
  roles:
    (** IRole 250) (
      (IntendedApplication of DISPLAYABSTRACTION)
        ValDescs = (ENEMYNTDSSHIPIAPL1)
      (** IRole 23) (
        (FixedComponent of DISPLAYITEMABSTRACTION)
          ValDescs = (EDGESET#60)
        (** IRole 207) (
          (FixedComponent of DISPLAYITEMABSTRACTION)
            ValDescs = (POINT#61)
            (InformationRequirement of DISPLAYABSTRACTION)
              ValDescs = (TEMPLATE)
              Number = (1 NIL)
              Modality = Optional
```

[63]

```
ENEMYNTDSPLANEIAPL1
  type: Individual
  individuates: TEMPLATE, THING
  roles:
    (** IRole 252) ((ConceptGroup of TEMPLATE))
      ValDescs = (CONCEPT#76)
    (** IRole 88) ((RoleGroup of TEMPLATE))
      ValDescs = (ROLE#77)
    (** IRole 253) ((RoleGroup of TEMPLATE))
      ValDescs = (ROLE#33)
    (** IRole 160) ((RoleGroup of TEMPLATE))
      ValDescs = (ROLE#78)
    (** IRole 170) ((RoleGroup of TEMPLATE))
      ValDescs = (ROLE#79)
    (** IRole 254) ((RoleGroup of TEMPLATE))
      ValDescs = (ROLE#35)
    (** IRole 224) ((RoleGroup of TEMPLATE))
      ValDescs = (ROLE#44)
    (** IRole 168) ((RoleGroup of TEMPLATE))
      ValDescs = (ROLE#80)
  is role value of
```

((** IRole 94) of ENEMYNTDSPLANEABSTR)

[64]

```

ENEMYNTDSSSHIP
  type: Generic
  specializes: NTDSITEM, MAPITEM, DISPLAY, PRESENTATION,
                DISPLAYITEM, THING
  roles:
    (** Application 5) of NTDSITEM) (
      (Application of PRESENTATION))
        ValDescs = (THING)
        Number = (0 NIL)
        Modality = Optional
        has attached IData:
          (Derivation Consequents)
            (EngagementMark VelocityLeader
              GroupStrengthMarker)
      (VelocityLeader of NTDSITEM) (
        (Realization of PRESENTATION))
          ValDescs = (NTDSVELOCITYLEADER)
          Number = 1
          Modality = Optional
        (EngagementMark of NTDSITEM) (
          (Realization of PRESENTATION))
            ValDescs = (NTDSENGAGEMENTMARK)
            Number = 1
            Modality = Optional
          (GroupStrengthMarker of NTDSITEM) (
            (Realization of PRESENTATION))
              ValDescs = (NTDSSTRENGTHMARK, DISPLAYITEM)
              Number = 1
              Modality = Optional
              has attached IData:
                (Derivation MakeNTDSSGroupStrengthMark?)
                  ((Prerequisites Application)
                    (Arguments (CKLFindNode $$CONCEPT
                                  Application)))
            (Label of MAPITEM) ((Realization of PRESENTATION))
              ValDescs = (TEXT)
              Number = 1
              Modality = Optional
              has attached IData:
                (Derivation MakeMapItemLabel?)
                  ((Prerequisites Application Ground)
                    (Arguments
                      (CAR (CKLFindNode $$CONCEPT

```

```
Application))
(CAR (CKLFindNode $$CONCEPT
Ground)
(FillWhenMade NIL)
T
(** Realization 8) of DISPLAY) (
(Realization of PRESENTATION))
  ValDescs = (DISPLAYITEM)
  Number = (0 NIL)
  Modality = Optional
  (Ground of DISPLAY)
    ValDescs = (VIEWSURFACE)
    Number = 1
    Modality = Obligatory
  (Name of DISPLAY)
    ValDescs = (STRINGP)
    Number = 1
    Modality = Optional
  (Location of DISPLAYITEM)
    ValDescs = (LISTP)
    Number = 1
    Modality = Optional
    has attached IData:
      (DefaultFiller NIL)
      (LIST 0 0)
  (Size of DISPLAYITEM)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
    has attached IData:
      (DefaultFiller NIL)
      1
  (Orientation of DISPLAYITEM)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
  (Width of DISPLAYITEM)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
  (Height of DISPLAYITEM)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
  (Envelope of DISPLAYITEM)
    ValDescs = (CLOSEDCURVE)
    Number = 1
    Modality = Optional
  is role value of (EnemyShipSym of NTDSMAP)
  has attached IData:
```

```
(ToDraw NIL)    TDDisplay
(ToLocate NIL)  TLDisplay TLDisplayItem
```

[65]

```
POINT#39
  type: Individual
  individuates: POINT, DISPLAYATOM, DISPLAYFORM,
                 DISPLAYITEM, THING
  roles:
    (** IRole 255) ((Location of DISPLAYITEM))
    ValDescs = ((0 0))
    has attached IData:
      (DefaultFiller NIL)
      (LIST 0 0)
    (Size of DISPLAYITEM)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
    has attached IData:
      (DefaultFiller NIL)
      1
    (Orientation of DISPLAYITEM)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
    (Width of DISPLAYITEM)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
    (Height of DISPLAYITEM)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
    (Envelope of DISPLAYITEM)
    ValDescs = (CLOSEDCURVE)
    Number = 1
    Modality = Optional
  is role value of
  (** IRole 248) of FRIENDLYNTDSSHIPABSTR)
  has attached IData:
    (ToDraw NIL)    TDPoint
    (ToErase NIL)   TEDisplayAtom
    (ToLocate NIL)  TLDisplayAtom TLDisplayItem
```

[66]

```
CIRCLE#38
  type: Individual
  individuates: CIRCLE, ELLIPSE, CLOSEDCURVE, CURVE,
                 DISPLAYATOM, DISPLAYFORM, DISPLAYITEM,
                 THING
```

```
roles:
  (** IRole 256) ((Radius of CIRCLE),
    (SemiMinorAxis of ELLIPSE),
    (SemiMajorAxis of ELLIPSE),
    (Size of DISPLAYITEM))
  ValDescs = (6, NUMBERP)
  has attached IData:
    (DefaultFiller NIL)
    1
  (** IRole 257) ((Center of ELLIPSE),
    (Location of DISPLAYITEM))
  ValDescs = ((0 0))
  has attached IData:
    (DefaultFiller NIL)
    (LIST 0 0)
  (Approximation of CURVE)
  ValDescs = (EDGESET)
  Number = 1
  Modality = Optional
  (Size of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
  has attached IData:
    (DefaultFiller NIL)
    1
  (Orientation of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
  (Width of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
  (Height of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
  (Envelope of DISPLAYITEM)
  ValDescs = (CLOSEDCURVE)
  Number = 1
  Modality = Optional
  is role value of
  (** IRole 247) of FRIENDLYNTDSSHIPABSTR)
```

[67]

ENEMYNTDSPLANE
type: Generic
specializes: NTDSITEM, MAPITEM, DISPLAY, PRESENTATION,

```
DISPLAYITEM, THING
roles:
  (** Application 5) of NTDSITEM) (
(Application of PRESENTATION)
  ValDescs = (THING)
  Number = (0 NIL)
  Modality = Optional
  has attached IData:
    (Derivation Consequents)
      (EngagementMark VelocityLeader
        GroupStrengthMarker)
  (VelocityLeader of NTDSITEM) (
(Realization of PRESENTATION)
  ValDescs = (NTDSVELOCITYLEADER)
  Number = 1
  Modality = Optional
  (EngagementMark of NTDSITEM) (
(Realization of PRESENTATION)
  ValDescs = (NTDSENGAGEMENTMARK)
  Number = 1
  Modality = Optional
  (GroupStrengthMarker of NTDSITEM) (
(Realization of PRESENTATION)
  ValDescs = (NTDSSTRENGTHMARK, DISPLAYITEM)
  Number = 1
  Modality = Optional
  has attached IData:
    (Derivation MakeNTDSGroupStrengthMark?)
      ((Prerequisites Application)
        (Arguments (CKLFindNode $$CONCEPT
          Application)))
  (Label of MAPITEM) ((Realization of PRESENTATION))
  ValDescs = (TEXT)
  Number = 1
  Modality = Optional
  has attached IData:
    (Derivation MakeMapItemLabel?)
      ((Prerequisites Application Ground)
        (Arguments
          (CAR (CKLFindNode $$CONCEPT
            Application))
          (CAR (CKLFindNode $$CONCEPT
            Ground))
        )
      )
  (FillWhenMade NIL)
  T
  (** Realization 8) of DISPLAY) (
```

```

(Realization of PRESENTATION)
  ValDescs = (DISPLAYITEM)
  Number = (0 NIL)
  Modality = Optional
(Ground of DISPLAY)
  ValDescs = (VIEWSURFACE)
  Number = 1
  Modality = Obligatory
(Name of DISPLAY)
  ValDescs = (STRINGP)
  Number = 1
  Modality = Optional
(Location of DISPLAYITEM)
  ValDescs = (LISTP)
  Number = 1
  Modality = Optional
  has attached IData:
    (DefaultFiller NIL)
      (LIST 0 0)
(Size of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
  has attached IData:
    (DefaultFiller NIL)
      1
(Orientation of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
(Width of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
(Height of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
(Envelope of DISPLAYITEM)
  ValDescs = (CLOSEDCURVE)
  Number = 1
  Modality = Optional
  is role value of (EnemyPlaneSym of NTDSMAP)
  has attached IData:
    (ToDraw NIL) TDDisplay
    (ToLocate NIL) TLDisplay TLDisplayItem

```

[68]

EDGESET

```

type: Generic
spec'lizes: DISPLAYATOM, DISPLAYFORM, DISPLAYITEM,

```

```

        THING
has individuators: EDGESET#46, EDGESET#53, EDGESET#60,
                    EDGESET#67, EDGESET#74, EDGESET#81,
                    EDGESET#88, EDGESET#95
roles:
  VertexList
    ValDescs = (LISTP)
    Number = 1
    Modality = Obligatory
  (Location of DISPLAYITEM)
    ValDescs = (LISTP)
    Number = 1
    Modality = Optional
    has attached IData:
      (DefaultFiller NIL)
      (LIST 0 0)
  (Size of DISPLAYITEM)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
    has attached IData:
      (DefaultFiller NIL)
      1
  (Orientation of DISPLAYITEM)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
  (Width of DISPLAYITEM)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
  (Height of DISPLAYITEM)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
  (Envelope of DISPLAYITEM)
    ValDescs = (CLOSEDCURVE)
    Number = 1
    Modality = Optional
is role value of (Approximation of CURVE)

```

[69]

```

ROLE#37
type: Individual
individuates: ROLE, THING
meta-describes:
  RoleSet Name in Context AIPSDOMAINMETA
is role value of (** IRole 203) of NTDSITEMIAPL1

```

[70]

```

ENEMYNTDSPLANEABSTR
type: Individual
individuates: DISPLAYABSTRACTION,
              DISPLAYITEMABSTRACTION, ABSTRACTION,
              THING
has schema: ENEMYNTDSPLANE
roles:
  (** IRole 94) (
(IntendedApplication of DISPLAYABSTRACTION)
  ValDescs = (ENEMYNTDSPLANEIAPL1)
  (** IRole 188) (
(FixedComponent of DISPLAYITEMABSTRACTION)
  ValDescs = (EDGESET#74)
  (** IRole 258) (
(FixedComponent of DISPLAYITEMABSTRACTION)
  ValDescs = (POINT#75)
  (InformationRequirement of DISPLAYABSTRACTION)
    ValDescs = (TEMPLATE)
    Number = (1 NIL)
    Modality = Optional

```

[71]

```

CONCEPT#31
type: Individual
individuates: CONCEPT, THING
meta-describes:
  Concept PLANE in Context AIPSDOMAINMETA
is role value of (** IRole 259) of NTDSITEMIAPL1

```

[72]

```

NTDSITEM
type: Generic
specializes: MAPITEM, DISPLAY, PRESENTATION,
             DISPLAYITEM, THING
has specializers: FRIENDLYNTDSSHIP, FRIENDLYNTDSPLANE,
                  FRIENDLYNTDSSUB, ENEMYNTDSSHIP,
                  ENEMYNTDSSUB, ENEMYNTDSPLANE,
                  UNKNOWNNTDSSHIP, UNKNOWNNTDSSUB,
                  UNKNOWNNTDSPLANE
roles:
  (** Application 5) ((Application of PRESENTATION))
  ValDescs = (THING)
  Number = (0 NIL)
  Modality = Optional
  has attached IData:
    (Derivation Consequents)

```

```
(EngagementMark VelocityLeader
  GroupStrengthMarker)
VelocityLeader ((Realization of PRESENTATION))
  ValDescs = (NTDSVELOCITYLEADER)
  Number = 1
  Modality = Optional
EngagementMark ((Realization of PRESENTATION))
  ValDescs = (NTDSENGAGEMENTMARK)
  Number = 1
  Modality = Optional
GroupStrengthMarker ((Realization of PRESENTATION))
  ValDescs = (NTDSSTRENGTHMARK, DISPLAYITEM)
  Number = 1
  Modality = Optional
  has attached IData:
    (Derivation MakeNTDSGroupStrengthMark?)
      ((Prerequisites Application)
       (Arguments (CKLFindNode $$CONCEPT
                  Application)))
(Label of MAPITEM) ((Realization of PRESENTATION))
  ValDescs = (TEXT)
  Number = 1
  Modality = Optional
  has attached IData:
    (Derivation MakeMapItemLabel?)
      [(Prerequisites Application Ground)
       (Arguments
         (CAR (CKLFindNode $$CONCEPT
                           Application))
         (CAR (CKLFindNode $$CONCEPT
                           Ground))
       (FillWhenMade NIL)
       T
      (** Realization 8) of DISPLAY) (
(Realization of PRESENTATION))
  ValDescs = (DISPLAYITEM)
  Number = (0 NIL)
  Modality = Optional
(Ground of DISPLAY)
  ValDescs = (VIEWSURFACE)
  Number = 1
  Modality = Obligatory
(Name of DISPLAY)
  ValDescs = (STRINGP)
  Number = 1
  Modality = Optional
(Location of DISPLAYITEM)
  ValDescs = (LISTP)
  Number = 1
  Modality = Optional
```

```

has attached IData:
  (DefaultFiller NIL)
    (LIST 0 0)
(Size of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
has attached IData:
  (DefaultFiller NIL)
    1
(Orientation of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
(Width of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
(Height of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
(Envelope of DISPLAYITEM)
  ValDescs = (CLOSEDCURVE)
  Number = 1
  Modality = Optional
has attached IData:
  (ToDraw NIL)  TDDisplay
  (ToLocate NIL)  TLDisplay TLDisplayItem

```

[73]

```

ROWTABLE
type: Generic
specializes: TABLE, COLUMN, ARRANGEMENT, DISPLAY,
             PRESENTATION, DISPLAYITEM, THING
roles:
  (** Ground 7) ((Ground of DISPLAY))
    ValDescs = (VIEWSURFACE)
    Number = 1
    Modality = Obligatory
  has attached IData:
    (Derivation MakeDefaultTableGround)
      NIL
  (** ThemeList 3) ((ThemeList of TABLE))
    ValDescs = (LISTP)
    Number = 1
    Modality = Optional
  Row ((Group of TABLE), (Item of ARRANGEMENT),
        (Realization of PRESENTATION))
    ValDescs = (TEXTROW)
    Number = (2 NIL)

```

```
    Modality = Obligatory
Header ((Row of ROWTABLE), (Group of TABLE),
        (Item of ARRANGEMENT),
        (Realization of PRESENTATION))
    ValDescs = (TEXTROW)
    Number = 1
    Modality = Obligatory
Foot ((Row of ROWTABLE), (Group of TABLE),
      (Item of ARRANGEMENT),
      (Realization of PRESENTATION))
    ValDescs = (TEXTROW)
    Number = 1
    Modality = Optional
Entry ((Row of ROWTABLE), (Group of TABLE),
       (Item of ARRANGEMENT),
       (Realization of PRESENTATION))
    ValDescs = (TEXTROW)
    Number = (1 NIL)
    Modality = Obligatory
(** ItemOrder 3) ((ItemOrder of ARRANGEMENT))
    ValDescs = (LISTP)
    Number = 1
    Modality = Optional
has attached IData:
    (Derivation MakeTableRowOrderList)
        [(Arguments
            (CAR (CKLFindNode
                  $$CONCEPT
                  (Supply Header)))
            (CKLFindNode $$CONCEPT
                  (Supply Entry)))
            (CAR (NLSETQ
                  (CKLFindNode $$CONCEPT
                  Foot)))]]
Column
    ValDescs = (TEXTCOLUMN)
    Number = 1
    Modality = Optional
(** Application 6) of TABLE) (
(Application of PRESENTATION))
    ValDescs = (THING)
    Number = 1
    Modality = Optional
(EntityList of TABLE)
    ValDescs = (LISTP)
    Number = 1
    Modality = Optional
(** Width 9) of COLUMN) ((Width of DISPLAYITEM))
    ValDescs = (NUMBERP)
    Number = 1
```

```
    Modality = Optional
    (Border of ARRANGEMENT) (
        (Realization of PRESENTATION)
            ValDescs = (CLOSEDCURVE)
            Number = 1
            Modality = Optional
            (Separator of ARRANGEMENT) (
                (Realization of PRESENTATION)
                    ValDescs = (DISPLAYITEM)
                    Number = (0 NIL)
                    Modality = Optional
                    (** Realization 8) of DISPLAY) (
                        (Realization of PRESENTATION)
                            ValDescs = (DISPLAYITEM)
                            Number = (0 NIL)
                            Modality = Optional
                            (Name of DISPLAY)
                                ValDescs = (STRINGP)
                                Number = 1
                                Modality = Optional
                            (Location of DISPLAYITEM)
                                ValDescs = (LISTP)
                                Number = 1
                                Modality = Optional
                                has attached IData:
                                    (DefaultFiller NIL)
                                    (LIST 0 0)
                            (Size of DISPLAYITEM)
                                ValDescs = (NUMBERP)
                                Number = 1
                                Modality = Optional
                                has attached IData:
                                    (DefaultFiller NIL)
                                    1
                            (Orientation of DISPLAYITEM)
                                ValDescs = (NUMBERP)
                                Number = 1
                                Modality = Optional
                            (Height of DISPLAYITEM)
                                ValDescs = (NUMBERP)
                                Number = 1
                                Modality = Optional
                            (Envelope of DISPLAYITEM)
                                ValDescs = (CLOSEDCURVE)
                                Number = 1
                                Modality = Optional
```

[74]

CONCEPT#30

type: Individual
individuates: CONCEPT, THING
meta-describes:
 Concept SUB in Context AIPSDOMAINMETA
is role value of (** IRole 195) of NTDSITEMIAPL1

[75]

ROLE#35

type: Individual
individuates: ROLE, THING
meta-describes:
 RoleSet Course in Context AIPSDOMAINMETA
is role value of (** IRole 201) of NTDSITEMIAPL1,
 (** IRole 243) of FRIENDLYNTDSSHIPIAPL1

 (** IRole 235) of FRIENDLYNTDSPLANEIAPL1
, (** IRole 33) of FRIENDLYNTDSSUBIAPL1,
 (** IRole 82) of ENEMYNTDSSHIPIAPL1,
 (** IRole 246) of ENEMYNTDSSUBIAPL1,
 (** IRole 254) of ENEMYNTDSPLANEIAPL1,
 (** IRole 260) of UNKNOWNNTDSSHIPIAPL1,
 (** IRole 261) of UNKNOWNNTDSSUBIAPL1,
 (** IRole 262) of UNKNOWNNTDSPLANEIAPL1

 (** IRole 263) of
NTDSVELOCITYLEADERIAPL1)

[76]

CONCEPT#29

type: Individual
individuates: CONCEPT, THING
meta-describes:
 Concept SHIP in Context AIPSDOMAINMETA
is role value of (** IRole 194) of NTDSITEMIAPL1

[77]

ROLE#34

type: Individual
individuates: ROLE, THING
meta-describes:
 RoleSet EngagementStatus in Context AIPSDOMAINMETA
is role value of (** IRole 200) of NTDSITEMIAPL1

[78]

ROLE#28

type: Individual

```

individuates: ROLE, THING
meta-describes:
  RoleSet Name in Context AIPSDOMAINMETA
  is role value of ((** IRole 264) of MAPITEMIAPL1)

```

[79]

```

ROLE#33
  type: Individual
  individuates: ROLE, THING
  meta-describes:
    RoleSet Medium in Context AIPSDOMAINMETA
    is role value of ((** IRole 265) of NTDSITEMIAPL1),
      ((** IRole 240) of FRIENDLYNTDSSHIPIAPL1)

    ((** IRole 234) of FRIENDLYNTDSPLANEIAPL1
), ((** IRole 213) of FRIENDLYNTDSSUBIAPL1),
  ((** IRole 80) of ENEMYNTDSSHIPIAPL1),
  ((** IRole 70) of ENEMYNTDSSUBIAPL1),
  ((** IRole 266) of ENEMYNTDSPLANEIAPL1),
  ((** IRole 178) of UNKNOWNNTDSSHIPIAPL1),
  ((** IRole 267) of UNKNOWNNTDSSUBIAPL1),
  ((** IRole 268) of UNKNOWNNTDSPLANEIAPL1)

```

[80]

```

LINESEGMENT#27
  type: Individual
  individuates: LINESEGMENT, CURVE, DISPLAYATOM,
    DISPLAYFORM, DISPLAYITEM, THING
  roles:
    (** IRole 269) ((EndPoint of LINESEGMENT),
      (Location of DISPLAYITEM))
    ValDescs = ((-6 6))
    has attached IData:
      (DefaultFiller NIL)
        (LIST 0 0)
    (** IRole 270) ((EndPoint of LINESEGMENT),
      (Location of DISPLAYITEM))
    ValDescs = ((6 -6))
    has attached IData:
      (DefaultFiller NIL)
        (LIST 0 0)
    (Line of LINESEGMENT)
    ValDescs = (LINE)
    Number = 1
    Modality = Optional
    has attached IData:
      (Derivation DeriveLineEquationFromEndpoints)
        ((Prerequisites EndPoint))
    (Approximation of CURVE)

```

```
    ValDescs = (EDGESET)
    Number = 1
    Modality = Optional
    (Size of DISPLAYITEM)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
    has attached IData:
        (DefaultFiller NIL)
        1
    (Orientation of DISPLAYITEM)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
    (Width of DISPLAYITEM)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
    (Height of DISPLAYITEM)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
    (Envelope of DISPLAYITEM)
    ValDescs = (CLOSEDCURVE)
    Number = 1
    Modality = Optional
is role value of ((** IRole 271) of MAPITEMABSTR)
has attached IData:
    (ToDraw NIL)    TDLineSegment TDCurve
    (ToErase NIL)   TEDisplayAtom
    (ToLocate NIL)  TLDisplayAtom TLDisplayItem
```

[81]

```
LINESEGMENT#26
type: Individual
individuates: LINESEGMENT, CURVE, DISPLAYATOM,
               DISPLAYFORM, DISPLAYITEM, THING
roles:
    (** IRole 272) ((EndPoint of LINESEGMENT),
                     (Location of DISPLAYITEM))
    ValDescs = ((-6 -6))
    has attached IData:
        (DefaultFiller NIL)
        (LIST 0 0)
    (** IRole 273) ((EndPoint of LINESEGMENT),
                     (Location of DISPLAYITEM))
    ValDescs = ((6 6))
    has attached IData:
        (DefaultFiller NIL)
        (LIST 0 0)
    (Line of LINESEGMENT)
```

```

ValDescs = (LINE)
Number = 1
Modality = Optional
has attached IData:
  (Derivation DeriveLineEquationFromEndpoints)
    ((Prerequisites EndPoint))
(Approximation of CURVE)
  ValDescs = (EDGESET)
  Number = 1
  Modality = Optional
(Size of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
has attached IData:
  (DefaultFiller NIL)
  1
(Orientation of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
(Width of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
(Height of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
(Envelope of DISPLAYITEM)
  ValDescs = (CLOSEDCURVE)
  Number = 1
  Modality = Optional
is role value of (** IRole 274) of MAPITEMABSTR)

```

[82]

```

ROLE#32
type: Individual
individuates: ROLE, THING
meta-describes:
  RoleSet Ownership in Context AIPSDOMAINMETA
is role value of (** IRole 197) of NTDSITEMIAPL1)

```

[83]

```

TEMPLATE
type: Generic
specializes: THING
has specializer: ITEMPLATE
has individuators: MAPIAPL1, MAPIAPL2, MAPITEMIAPL1,

```

```

NTDSITEMIAPL1,
FRIENDLYNTDSSHIPIAPL1,
FRIENDLYNTDSPLANEIAPL1,
FRIENDLYNTDSSUBIAPL1,
ENEMYNTDSSHIPIAPL1,
ENEMYNTDSSUBIAPL1,
ENEMYNTDSPLANEIAPL1,
UNKNOWNNTDSSHIPIAPL1,
UNKNOWNNTDSSUBIAPL1,
UNKNOWNNTDSPLANEIAPL1,
NTDSENGAGEMENTMARKIAPL1,
NTDSVELOCITYLEADERIAPL1

```

roles:

```

ConceptGroup
  ValDescs = (CONCEPT)
  Number = (0 NIL)
  Modality = Optional
RoleGroup
  ValDescs = (ROLE)
  Number = (1 NIL)
  Modality = Obligatory

```

is role value of

```

(IntendedApplication of DISPLAYABSTRACTION),
  (InformationRequirement of
DISPLAYABSTRACTION)

```

[84]

ROLE#25

```

type: Individual
individuates: ROLE, THING
meta-describes:
  RoleSet Boundary in Context AIPSDOMAINMETA
is role value of (** IRole 275) of MAPIAPL2

```

[85]

TEXTROW

```

type: Generic
specializes: ROW, ARRANGEMENT, DISPLAY, PRESENTATION,
  DISPLAYITEM, THING
roles:
  (** Item 9) ((Item of ARRANGEMENT),
    (Realization of PRESENTATION))
  ValDescs = (TEXT)
  Number = (2 NIL)
  Modality = Obligatory
  (** Height 10) of ROW ((Height of DISPLAYITEM))
  ValDescs = (NUMBERP)
  Number = 1

```

```
    Modality = Optional
  (ItemOrder of ARRANGEMENT)
    ValDescs = (LISTP)
    Number = 1
    Modality = Optional
  (Border of ARRANGEMENT) (


  (Realization of PRESENTATION)
    ValDescs = (CLOSEDCURVE)
    Number = 1
    Modality = Optional
  (Separator of ARRANGEMENT) (


  (Realization of PRESENTATION)
    ValDescs = (DISPLAYITEM)
    Number = (0 NIL)
    Modality = Optional
  ((** Realization 8) of DISPLAY) (


  (Realization of PRESENTATION)
    ValDescs = (DISPLAYITEM)
    Number = (0 NIL)
    Modality = Optional
  (Ground of DISPLAY)
    ValDescs = (VIEWSURFACE)
    Number = 1
    Modality = Obligatory
  (Name of DISPLAY)
    ValDescs = (STRINGP)
    Number = 1
    Modality = Optional
  (Application of PRESENTATION)
    ValDescs = (THING)
    Number = (0 NIL)
    Modality = Optional
  (Location of DISPLAYITEM)
    ValDescs = (LISTP)
    Number = 1
    Modality = Optional
    has attached IData:
      (DefaultFiller NIL)
        (LIST 0 0)
  (Size of DISPLAYITEM)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
    has attached IData:
      (DefaultFiller NIL)
        1
  (Orientation of DISPLAYITEM)
    ValDescs = (NUMBERP)
```

```

Number = 1
Modality = Optional
(Width of DISPLAYITEM)
  ValDescs = (NUMBERP)
Number = 1
Modality = Optional
(Envelope of DISPLAYITEM)
  ValDescs = (CLOSEDCURVE)
Number = 1
Modality = Optional
is role value of (Row of ROWTABLE),
  (Row of COLUMNTABLE)

```

[86]

TRANSFIX

```

type: Generic
specializes: 2DLINEARTRANSFIX, TRANSLATION,
  2DLINEARTRANSFORM, LINEARTRANSFORM,
  MAPPING, THING
roles:
  (** To 6) of 2DLINEARTRANSFIX ((To of MAPPING))
    ValDescs = (VIEWSYSTEM)
    Number = (1 NIL)
    Modality = Obligatory
  (** UnitVector 3) of TRANSLATION (
    (UnitVector of LINEARTRANSFORM)
      ValDescs = ((1 1))
      Number = 1
      Modality = Optional
    (** From 4) of 2DLINEARTRANSFORM (
      (From of MAPPING)
        ValDescs = (CARTESIANSYSTEM)
        Number = (1 NIL)
        Modality = Obligatory
      (Origin of LINEARTRANSFORM)
        ValDescs = (LISTP)
        Number = 1
        Modality = Optional

```

[87]

2DLINEARTRANSFORM

```

type: Generic
specializes: LINEARTRANSFORM, MAPPING, THING
has specializers: 2DLINEARTRANSFIX, TRANSLATION,
  TRANSFIX
roles:
  (** From 4) ((From of MAPPING))
    ValDescs = (CARTESIANSYSTEM)

```

```

Number = (1 NIL)
Modality = Obligatory
(** To 7) ((To of MAPPING))
ValDescs = (CARTESIANSYSTEM)
Number = (1 NIL)
Modality = Obligatory
(Origin of LINEARTRANSFORM)
ValDescs = (LISTP)
Number = 1
Modality = Optional
(UnitVector of LINEARTRANSFORM)
ValDescs = (LISTP)
Number = 1
Modality = Optional
is role value of

(** MapItemTransform 5) of RECTANGULARMAP)

```

[88]

CONCEPT#24

```

type: Individual
individuates: CONCEPT, THING
meta-describes:
    Concept REGION in Context AIPSDOMAINMETA
is role value of (** IRole 276) of MAPIAPL2)

```

[89]

```

2DLINEARTRANSFIX
type: Generic
specializes: 2DLINEARTRANSFORM, LINEARTRANSFORM,
            MAPPING, THING
has specializer: TRANSFIX
roles:
    (** To 6) ((To of MAPPING))
    ValDescs = (VIEWSYSTEM)
    Number = (1 NIL)
    Modality = Obligatory
    (** From 4) of 2DLINEARTRANSFORM) (
        (From of MAPPING))
        ValDescs = (CARTESIANSYSTEM)
        Number = (1 NIL)
        Modality = Obligatory
        (Origin of LINEARTRANSFORM)
        ValDescs = (LISTP)
        Number = 1
        Modality = Optional
        (UnitVector of LINEARTRANSFORM)
        ValDescs = (LISTP)

```

Number = 1
Modality = Optional

[90]

VEHICLE

type: Generic
specializes: PHYSOBJECT, THING
has specializers: PLATFORM, SHIP, SUB, PLANE,
FRIENDLYSHIP, ENEMYSHIP,
UNKNOWNSHIP, FRIENDLYSUB, ENEMYSUB,
UNKNOWNSUB, FRIENDLYPLANE,
ENEMYPLANE, UNKNOWNPLANE

roles:

Medium

ValDescs = (ATOM)
Number = 1
Modality = Optional
has meta descriptions:
[in Context AIPSDOMAINMETA]
ROLE#33
type: Individual
individuates: ROLE
meta-describes:
RoleSet Medium in Context AIPSDOMAINMETA

Course

ValDescs = (NUMBERP)
Number = 1
Modality = Optional
has meta descriptions:
[in Context AIPSDOMAINMETA]
ROLE#35
type: Individual
individuates: ROLE
meta-describes:
RoleSet Course in Context AIPSDOMAINMETA

Speed

ValDescs = (SPEED)
Number = 1
Modality = Optional
has meta descriptions:
[in Context AIPSDOMAINMETA]
ROLE#44
type: Individual
individuates: ROLE
meta-describes:
RoleSet Speed in Context AIPSDOMAINMETA

(Position of PHYSOBJECT)

ValDescs = (PLACE)
Number = 1
Modality = Optional

(Name of PHYSOBJECT)

```

ValDescs = (STRINGP)
Number = 1
Modality = Optional
has meta descriptions:
  [in Context AIPSDOMAINMETA]
    ROLE#101
      type: Individual
      individuates: ROLE
      meta-describes:
        RoleSet Name    in Context AIPSDOMAINMETA
[91]

```

```

INTEGERSYSTEM
  type: Generic
  specializes: COORDINATESYSTEM, THING
  has specializer: VIEWSYSTEM
  roles:
    (Name of COORDINATESYSTEM)
      ValDescs = (STRINGP)
      Number = 1
      Modality = Optional
    (Exit of COORDINATESYSTEM)
      ValDescs = (MAPPING)
      Number = (0 NIL)
      Modality = Optional
    (Entry of COORDINATESYSTEM)
      ValDescs = (MAPPING)
      Number = (0 NIL)
      Modality = Optional
    (Dimensionality of COORDINATESYSTEM)
      ValDescs = (NUMBERP)
      Number = 1
      Modality = Obligatory
[92]

```

```

TABLE
  type: Generic
  specializes: ARRANGEMENT, DISPLAY, PRESENTATION,
    DISPLAYITEM, THING
  has specializers: ROWTABLE, COLUMNTABLE
  roles:
    (** Application 7) ((Application of PRESENTATION))
      ValDescs = (THING)
      Number = 1
      Modality = Optional
    Group ((Item of ARRANGEMENT),
      (Realization of PRESENTATION))
      ValDescs = (ARRANGEMENT)
      Number = (2 NIL)
      Modality = Obligatory
    EntityList

```

```
ValDescs = (LISTP)
Number = 1
Modality = Optional
ThemeList
  ValDescs = (LISTP)
  Number = 1
  Modality = Optional
(ItemOrder of ARRANGEMENT)
  ValDescs = (LISTP)
  Number = 1
  Modality = Optional
(Border of ARRANGEMENT) (
(Realization of PRESENTATION))
  ValDescs = (CLOSEDCURVE)
  Number = 1
  Modality = Optional
(Separator of ARRANGEMENT) (
(Realization of PRESENTATION))
  ValDescs = (DISPLAYITEM)
  Number = (0 NIL)
  Modality = Optional
((** Realization 8) of DISPLAY) (
(Realization of PRESENTATION))
  ValDescs = (DISPLAYITEM)
  Number = (0 NIL)
  Modality = Optional
(Ground of DISPLAY)
  ValDescs = (VIEWSURFACE)
  Number = 1
  Modality = Obligatory
(Name of DISPLAY)
  ValDescs = (STRINGP)
  Number = 1
  Modality = Optional
(Location of DISPLAYITEM)
  ValDescs = (LISTP)
  Number = 1
  Modality = Optional
  has attached IData:
    (DefaultFiller NIL)
    (LIST 0 0)
(Size of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
  has attached IData:
    (DefaultFiller NIL)
    1
```

```

(Orientation of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
(Width of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
(Height of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
(Envelope of DISPLAYITEM)
  ValDescs = (CLOSEDCURVE)
  Number = 1
  Modality = Optional

```

[93]

```

TIMESYSTEM
  type: Generic
  specializes: COORDINATESYSTEM, THING
  roles:
    (** Dimensionality 3) (
(Dimensionality of COORDINATESYSTEM))
  ValDescs = (1, NUMBERP)
  Number = 1
  Modality = Obligatory
(Name of COORDINATESYSTEM)
  ValDescs = (STRINGP)
  Number = 1
  Modality = Optional
(Exit of COORDINATESYSTEM)
  ValDescs = (MAPPING)
  Number = (0 NIL)
  Modality = Optional
(Entry of COORDINATESYSTEM)
  ValDescs = (MAPPING)
  Number = (0 NIL)
  Modality = Optional
  is role value of (Continuum of TIME)

```

[94]

```

COORDINATESYSTEM
  type: Generic
  specializes: THING
  has specializers: INTEGERSYSTEM, 2DCOORDINATESYSTEM,
                    ORTHOGONALSYSTEM, TIMESYSTEM,
                    CARTESIANSYSTEM, VIEWSYSTEM
  roles:

```

```

Name
  ValDescs = (STRINGP)
  Number = 1
  Modality = Optional
Exit
  ValDescs = (MAPPING)
  Number = (0 NIL)
  Modality = Optional
Entry
  ValDescs = (MAPPING)
  Number = (0 NIL)
  Modality = Optional
Dimensionality
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Obligatory
is role value of (From of MAPPING), (To of MAPPING),
(Continuum of PLACE)

```

[95]

```

CONCEPT#22
type: Individual
individuates: CONCEPT, THING
meta-describes:
  Concept PHYSOBJECT in Context AIPSDOMAINMETA
is role value of ((** IRole 277) of MAPIAPL1),
  ((** IRole 278) of MAPITEMIAPL1)

```

[96]

```

2DCOORDINATESYSTEM
type: Generic
specializes: COORDINATESYSTEM, THING
has specializers: CARTESIANSYSTEM, VIEWSYSTEM
roles:
  (** Dimensionality 4) (
(Dimensionality of COORDINATESYSTEM))
  ValDescs = (2, NUMBERP)
  Number = 1
  Modality = Obligatory
  (Name of COORDINATESYSTEM)
  ValDescs = (STRINGP)
  Number = 1
  Modality = Optional
  (Exit of COORDINATESYSTEM)
  ValDescs = (MAPPING)
  Number = (0 NIL)
  Modality = Optional
  (Entry of COORDINATESYSTEM)

```

```
    ValDescs = (MAPPING)
    Number = (0 NIL)
    Modality = Optional
    is role value of (DomainCoordSys of MAP)
```

[97]

```
TEXTCOLUMN
  type: Generic
  specializes: COLUMN, ARRANGEMENT, DISPLAY,
    PRESENTATION, DISPLAYITEM, THING
  roles:
    (** Item 10) ((Item of ARRANGEMENT),
      (Realization of PRESENTATION))
    ValDescs = (TEXT)
    Number = (2 NIL)
    Modality = Obligatory
    (** Width 9) of COLUMN ((Width of DISPLAYITEM))
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
    (ItemOrder of ARRANGEMENT)
    ValDescs = (LISTP)
    Number = 1
    Modality = Optional
    (Border of ARRANGEMENT) (
      (Realization of PRESENTATION))
      ValDescs = (CLOSEDCURVE)
      Number = 1
      Modality = Optional
      (Separator of ARRANGEMENT) (
        (Realization of PRESENTATION))
        ValDescs = (DISPLAYITEM)
        Number = (0 NIL)
        Modality = Optional
        (** Realization 8) of DISPLAY) (
          (Realization of PRESENTATION))
          ValDescs = (DISPLAYITEM)
          Number = (0 NIL)
          Modality = Optional
          (Ground of DISPLAY)
          ValDescs = (VIEWSURFACE)
          Number = 1
          Modality = Obligatory
          (Name of DISPLAY)
          ValDescs = (STRINGP)
          Number = 1
          Modality = Optional
```

```

(Application of PRESENTATION)
  ValDescs = (THING)
  Number = (0 NIL)
  Modality = Optional
(Location of DISPLAYITEM)
  ValDescs = (LISTP)
  Number = 1
  Modality = Optional
  has attached IData:
    (DefaultFiller NIL)
      (LIST 0 0)
(Size of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
  has attached IData:
    (DefaultFiller NIL)
    1
(Orientation of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
(Height of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
(Envelope of DISPLAYITEM)
  ValDescs = (CLOSEDCURVE)
  Number = 1
  Modality = Optional
is role value of (Column of ROWTABLE),
  (Column of COLUMNTABLE)

```

[98]

```

LISPDATA
  type: Generic
  specializes: THING

```

[99]

```

COLUMNTABLE
  type: Generic
  specializes: TABLE, ROW, ARRANGEMENT, DISPLAY,
    PRESENTATION, DISPLAYITEM, THING
  roles:
    (** Ground 8) ((Ground of DISPLAY))
      ValDescs = (VIEWSURFACE)
      Number = 1
      Modality = Obligatory
    (** ThemeList 4) ((ThemeList of TABLE))

```

```

ValDescs = (LISTP)
Number = 1
Modality = Optional
Column ((Group of TABLE), (Item of ARRANGEMENT),
         (Realization of PRESENTATION))
ValDescs = (TEXTCOLUMN)
Number = (2 NIL)
Modality = Obligatory
LeftIndex ((Column of COLUMNTABLE),
           (Group of TABLE), (Item of ARRANGEMENT),
           (Realization of PRESENTATION))
ValDescs = (TEXTCOLUMN)
Number = 1
Modality = Obligatory
has attached IData:
  (Derivation MakeTableLeftIndex)
    [(Arguments
      (CAR (CKLFindNode
             $$CONCEPT
             (Supply ThemeList)))
      (CAR (CKLFindNode
             $$CONCEPT
             (Supply Ground)
(FillWhenMade NIL)
T
RightIndex ((Column of COLUMNTABLE),
            (Group of TABLE),
            (Item of ARRANGEMENT),
            (Realization of PRESENTATION))
ValDescs = (TEXTCOLUMN)
Number = 1
Modality = Optional
Entry ((Column of COLUMNTABLE), (Group of TABLE),
       (Item of ARRANGEMENT),
       (Realization of PRESENTATION))
ValDescs = (TEXTCOLUMN)
Number = (1 NIL)
Modality = Obligatory
(** ItemOrder 4) ((ItemOrder of ARRANGEMENT))
ValDescs = (LISTP)
Number = 1
Modality = Optional
Row
ValDescs = (TEXTROW)
Number = 1
Modality = Optional
has attached IData:
  (Derivation FindColumnTableRows)
    [(Prerequisites Column)
     (Arguments
      (CAR (CKLFindNode

```

```
      $$CONCEPT
      (Supply ItemOrder)))
      (FLENGTH
      (CAR (CKLFindNode $$CONCEPT
      ThemeList)
      (** Application 7) of TABLE) (
      (Application of PRESENTATION))
      ValDescs = (THING)
      Number = 1
      Modality = Optional
      (EntityList of TABLE)
      ValDescs = (LISTP)
      Number = 1
      Modality = Optional
      (** Height 11) of ROW) ((Height of DISPLAYITEM))
      ValDescs = (NUMBERP)
      Number = 1
      Modality = Optional
      (Border of ARRANGEMENT) (
      (Realization of PRESENTATION))
      ValDescs = (CLOSEDCURVE)
      Number = 1
      Modality = Optional
      (Separator of ARRANGEMENT) (
      (Realization of PRESENTATION))
      ValDescs = (DISPLAYITEM)
      Number = (0 NIL)
      Modality = Optional
      (** Realization 8) of DISPLAY) (
      (Realization of PRESENTATION))
      ValDescs = (DISPLAYITEM)
      Number = (0 NIL)
      Modality = Optional
      (Name of DISPLAY)
      ValDescs = (STRINGP)
      Number = 1
      Modality = Optional
      (Location of DISPLAYITEM)
      ValDescs = (LISTP)
      Number = 1
      Modality = Optional
      has attached IData:
      (DefaultFiller NIL)
      (LIST 0 0)
      (Size of DISPLAYITEM)
      ValDescs = (NUMBERP)
      Number = 1
```

```
Modality = Optional
has attached IData:
  (DefaultFiller NIL)
  1
(Orientation of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
(Width of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
(Envelope of DISPLAYITEM)
  ValDescs = (CLOSEDCURVE)
  Number = 1
  Modality = Optional
```

[100]

```
SPEEDUNIT
type: Generic
specializes: UNIT, THING
roles:
  DistanceUnit
    ValDescs = (THING)
    Number = 1
    Modality = Optional
  IntervalUnit
    ValDescs = (THING)
    Number = 1
    Modality = Optional
  (** Subject 4) ((Subject of UNIT))
    ValDescs = (SPEED)
    Number = 1
    Modality = Optional
is role value of (** Unit 5) of SPEED)
```

[101]

```
SPEED
type: Generic
specializes: METRIC, THING
roles:
  (** Unit 5) ((Unit of METRIC))
    ValDescs = (THING)
    Number = 1
    Modality = Optional
  (Magnitude of METRIC)
    ValDescs = (THING)
    Number = 1
    Modality = Optional
is role value of (Speed of VEHICLE),
```

((** Subject 4) of SPEEDUNIT)

[102]

RECTANGLE

type: Generic
specializes: POLYGON, DISPLAYCOMPOSITE, CLOSEDCURVE,
CURVE, DISPLAYATOM, DISPLAYFORM,
DISPLAYITEM, THING

roles:

- (** Order 2) ((Order of POLYGON))
ValDescs = (THING)
Number = 1
Modality = Optional
- (** Side 2) ((Side of POLYGON),
(Component of DISPLAYCOMPOSITE))
ValDescs = (THING)
Number = 4
Modality = Optional
- LowerLeft ((Location of DISPLAYITEM))
ValDescs = (THING)
Number = 1
Modality = Optional
- UpperRight ((Location of DISPLAYITEM))
ValDescs = (THING)
Number = 1
Modality = Optional
- (** Height 12) ((Height of DISPLAYITEM))
ValDescs = (THING)
Number = 1
Modality = Optional
- (** Width 10) ((Width of DISPLAYITEM))
ValDescs = (THING)
Number = 1
Modality = Optional
- (CoordSys of DISPLAYCOMPOSITE)
ValDescs = (CARTESIANSYSTEM)
Number = 1
Modality = Optional
- (Approximation of CURVE)
ValDescs = (EDGESET)
Number = 1
Modality = Optional
- (Location of DISPLAYITEM)
ValDescs = (LISTP)
Number = 1
Modality = Optional
- has attached IData:
(DefaultFiller NIL)
(LIST 0 0)
- (Size of DISPLAYITEM)

```
ValDescs = (NUMBERP)
Number = 1
Modality = Optional
has attached IData:
  (DefaultFiller NIL)
  1
(Orientation of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
(Envelope of DISPLAYITEM)
  ValDescs = (CLOSEDCURVE)
  Number = 1
  Modality = Optional
is role value of (** Border 5) of RECTANGULARMAP,
  (** Boundary 5) of RECTANGULARREGION)
```

[103]

MAP

```
type: Generic
specializes: DISPLAY, PRESENTATION, DISPLAYITEM,
  THING
has specializers: RECTANGULARMAP, MAPWITHBACKGROUND,
  NTDSMAP
has abstraction: MAPABSTR
roles:
  EntityList
    ValDescs = (LISTP)
    Number = 1
    Modality = Optional
    (** Name 4) ((Name of DISPLAY))
    ValDescs = (STRINGP)
    Number = 1
    Modality = Obligatory
    has attached IData:
      (FillWhenMade NIL)
      T
  DomainCoordSys
    ValDescs = (2DCOORDINATESYSTEM)
    Number = 1
    Modality = Optional
  MapItemTransform
    ValDescs = (MAPPING)
    Number = 1
    Modality = Obligatory
    Label ((Realization of PRESENTATION))
    ValDescs = (TEXT)
    Number = 1
    Modality = Optional
    has attached IData:
```

```
(Derivation MakeMapLabel)
  [(Prerequisites Name Ground)
   (Arguments
     (CAR (CKLFindNode $$CONCEPT
                           Name))
     (CAR (CKLFindNode $$CONCEPT
                           Ground))
   (FillWhenMade NIL)
   T
  Border ((Realization of PRESENTATION))
  ValDescs = (CLOSEDCURVE)
  Number = 1
  Modality = Optional
  Legend ((Realization of PRESENTATION))
  ValDescs = (MAPLEGEND)
  Number = 1
  Modality = Optional
  has attached IData:
  (Derivation MakeSimpleMapLegend)
    [(Prerequisites Name Item)
     (Arguments
       (CAR (CKLFindNode $$CONCEPT
                           Name))
       (CKLFindNode $$CONCEPT Item)))
  (FillWhenMade NIL)
  T
  ReferenceGrid ((Realization of PRESENTATION))
  ValDescs = (MAPGRID)
  Number = 1
  Modality = Optional
  Item ((Realization of PRESENTATION))
  ValDescs = (MAPITEM)
  Number = (1 NIL)
  Modality = Obligatory
  has attached IData:
  (Derivation MakeMapItems)
    [(Prerequisites EntityList
                           Application Ground)
     (Arguments
       (CKLFindNode $$CONCEPT
                           Application)
       (CAR (CKLFindNode $$CONCEPT
                           EntityList))
       (CAR (CKLFindNode $$CONCEPT
                           Ground))
  (FillWhenMade NIL)
  T
  ((** Realization 8) of DISPLAY) (
  (Realization of PRESENTATION))
  ValDescs = (DISPLAYITEM)
```

```

Number = (0 NIL)
Modality = Optional
(Ground of DISPLAY)
ValDescs = (VIEWSURFACE)
Number = 1
Modality = Obligatory
(Application of PRESENTATION)
ValDescs = (THING)
Number = (0 NIL)
Modality = Optional
(Location of DISPLAYITEM)
ValDescs = (LISTP)
Number = 1
Modality = Optional
has attached IData:
  (DefaultFiller NIL)
    (LIST 0 0)
(Size of DISPLAYITEM)
ValDescs = (NUMBERP)
Number = 1
Modality = Optional
has attached IData:
  (DefaultFiller NIL)
  1
(Orientation of DISPLAYITEM)
ValDescs = (NUMBERP)
Number = 1
Modality = Optional
(Width of DISPLAYITEM)
ValDescs = (NUMBERP)
Number = 1
Modality = Optional
(Height of DISPLAYITEM)
ValDescs = (NUMBERP)
Number = 1
Modality = Optional
(Envelope of DISPLAYITEM)
ValDescs = (CLOSEDCURVE)
Number = 1
Modality = Optional
has attached data:
  DefaultPrototype
    (CKLGetNamedConcept RECTANGULARMAP)

```

[104]

CLOSEDCURVE
 type: Generic
 specializes: CURVE, DISPLAYATOM, DISPLAYFORM,
 DISPLAYITEM, THING
 has specializers: ELLIPSE, POLYGON, CIRCLE,

```
REGULARPOLYGON, RECTANGLE
has individuator: CIRCLE#38
roles:
  (Approximation of CURVE)
    ValDescs = (EDGESET)
    Number = 1
    Modality = Optional
  (Location of DISPLAYITEM)
    ValDescs = (LISTP)
    Number = 1
    Modality = Optional
  has attached IData:
    (DefaultFiller NIL)
      (LIST 0 0)
  (Size of DISPLAYITEM)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
  has attached IData:
    (DefaultFiller NIL)
      1
  (Orientation of DISPLAYITEM)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
  (Width of DISPLAYITEM)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
  (Height of DISPLAYITEM)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
  (Envelope of DISPLAYITEM)
    ValDescs = (CLOSEDCURVE)
    Number = 1
    Modality = Optional
  is role value of (Envelope of DISPLAYITEM),
    (Boundary of REGION),
    (Border of ARRANGEMENT),
    (Border of MAP)
has attached IData:
  (ToDraw NIL)  TDCurve
  (ToErase NIL) TEDisplayAtom
  (ToLocate NIL) TLDdisplayAtom TLDdisplayItem
```

[105]

```
COLUMN
  type: Generic
  specializes: ARRANGEMENT, DISPLAY, PRESENTATION,
  DISPLAYITEM, THING
```

```
has specializers: TEXTCOLUMN, ROWTABLE
roles:
  (** Item 11) ((Item of ARRANGEMENT),
                 (Realization of PRESENTATION))
    ValDescs = (DISPLAY)
    Number = (2 NIL)
    Modality = Obligatory
  (** Width 9) ((Width of DISPLAYITEM))
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
  (ItemOrder of ARRANGEMENT)
    ValDescs = (LISTP)
    Number = 1
    Modality = Optional
  (Border of ARRANGEMENT) (
    (Realization of PRESENTATION))
    ValDescs = (CLOSEDCURVE)
    Number = 1
    Modality = Optional
  (Separator of ARRANGEMENT) (
    (Realization of PRESENTATION))
    ValDescs = (DISPLAYITEM)
    Number = (0 NIL)
    Modality = Optional
  ((** Realization 8) of DISPLAY) (
    (Realization of PRESENTATION))
    ValDescs = (DISPLAYITEM)
    Number = (0 NIL)
    Modality = Optional
  (Ground of DISPLAY)
    ValDescs = (VIEWSURFACE)
    Number = 1
    Modality = Obligatory
  (Name of DISPLAY)
    ValDescs = (STRINGP)
    Number = 1
    Modality = Optional
  (Application of PRESENTATION)
    ValDescs = (THING)
    Number = (0 NIL)
    Modality = Optional
  (Location of DISPLAYITEM)
    ValDescs = (LISTP)
    Number = 1
    Modality = Optional
  has attached IData:
    (DefaultFiller NIL)
```

```

        (LIST 0 0)
(Size of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
  has attached IData:
    (DefaultFiller NIL)
      1
(Orientation of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
(Height of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
(Envelope of DISPLAYITEM)
  ValDescs = (CLOSEDCURVE)
  Number = 1
  Modality = Optional

```

[106]

MAPPING

```

type: Generic
specializes: THING
has specializers: LINEARTRANSFORM, 2DLINEARTRANSFORM,
                  2DLINEARTRANSFIX, TRANSLATION,
                  TRANSFIX
roles:
  From
    ValDescs = (COORDINATESYSTEM)
    Number = (1 NIL)
    Modality = Obligatory
  To
    ValDescs = (COORDINATESYSTEM)
    Number = (1 NIL)
    Modality = Obligatory
  is role value of (Exit of COORDINATESYSTEM),
                  (Entry of COORDINATESYSTEM),
                  (MapItemTransform of MAP)

```

[107]

ROLE#23

```

type: Individual
individuates: ROLE, THING
meta-describes:
  RoleSet Position in Context AIPSDOMAINMETA
  is role value of ((** IRole 279 of MAPIAPL1),
                    ((** IRole 280) of MAPITEMIAPL1),
                    ((** IRole 199) of NTDSITEMIAPL1)

```

[108]

MAPWITHBACKGROUND
type: Generic
specializes: MAP, DISPLAY, PRESENTATION, DISPLAYITEM,
THING
roles:
(** Ground 9) ((Ground of DISPLAY))
ValDescs = (VIEWSURFACE)
Number = 1
Modality = Obligatory
(** MapItemTransform 6) ((MapItemTransform of MAP))
ValDescs = (MAPPING)
Number = 1
Modality = Obligatory
has attached IData:
 (Derivation MakeMapTransformForMapWithBackground)
 [(Prerequisites Ground)
 (Arguments
 [CAR
 (KLFindVRsOfRole
 (KLFindOneNamedGenericRole
 \$\$CONCEPT
 (QUOTE MapItemTransform)
 (CAR (CKLFindNode \$\$CONCEPT
 DomainCoordSys))
 (CAR (CKLFindNode \$\$CONCEPT
 Ground])
 (** ReferenceGrid 2) ((ReferenceGrid of MAP),
 (Realization of PRESENTATION))
 ValDescs = (MAPGRID)
 Number = (0 0)
 Modality = Optional
 (EntityList of MAP)
 ValDescs = (LISTP)
 Number = 1
 Modality = Optional
 (** Name 4) of MAP ((Name of DISPLAY))
 ValDescs = (STRINGP)
 Number = 1
 Modality = Obligatory
 has attached IData:
 (FillWhenMade NIL)
 T
 (DomainCoordSys of MAP)
 ValDescs = (2DCOORDINATESYSTEM)
 Number = 1
 Modality = Optional
 (Label of MAP) ((Realization of PRESENTATION))
 ValDescs = (TEXT)

```
Number = 1
Modality = Optional
has attached IData:
  (Derivation MakeMapLabel)
    [(Prerequisites Name Ground)
     (Arguments
      (CAR (CKLFindNode $$CONCEPT
                           Name))
      (CAR (CKLFindNode $$CONCEPT
                           Ground))
     (FillWhenMade NIL)
     T
    (Border of MAP) ((Realization of PRESENTATION))
    ValDescs = (CLOSEDCURVE)
    Number = 1
    Modality = Optional
  (Legend of MAP) ((Realization of PRESENTATION))
  ValDescs = (MAPLEGEND)
  Number = 1
  Modality = Optional
  has attached IData:
    (Derivation MakeSimpleMapLegend)
      ((Prerequisites Name Item)
       (Arguments
        (CAR (CKLFindNode $$CONCEPT
                           Name))
        (CKLFindNode $$CONCEPT Item)))
      (FillWhenMade NIL)
      T
  (Item of MAP) ((Realization of PRESENTATION))
  ValDescs = (MAPITEM)
  Number = (1 NIL)
  Modality = Obligatory
  has attached IData:
    (Derivation MakeMapItems)
      [(Prerequisites EntityList
                           Application Ground)
       (Arguments
        (CKLFindNode $$CONCEPT
                           Application)
        (CAR (CKLFindNode $$CONCEPT
                           EntityList))
        (CAR (CKLFindNode $$CONCEPT
                           Ground))
     (FillWhenMade NIL)
     T
    (** Realization 8) of DISPLAY) (
  (Realization of PRESENTATION))
  ValDescs = (DISPLAYITEM)
  Number = (0 NIL)
```

```

  Modality = Optional
  (Application of PRESENTATION)
    ValDescs = (THING)
    Number = (0 NIL)
    Modality = Optional
    (Location of DISPLAYITEM)
      ValDescs = (LISTP)
      Number = 1
      Modality = Optional
      has attached IData:
        (DefaultFiller NIL)
          (LIST 0 0)
  (Size of DISPLAYITEM)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
    has attached IData:
      (DefaultFiller NIL)
        1
  (Orientation of DISPLAYITEM)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
  (Width of DISPLAYITEM)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
  (Height of DISPLAYITEM)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
  (Envelope of DISPLAYITEM)
    ValDescs = (CLOSEDCURVE)
    Number = 1
    Modality = Optional
  has attached IData:
    (MinInterItemSpacing NIL)
      10
    (MinItemSpread NIL)
      150
    (ToDraw NIL)    TDDisplay
    (ToLocate NIL)  TLDdisplay TLDdisplayItem

```

[109]

```

ORTHOGONALSYSTEM
  type: Generic
  specializes: COORDINATESYSTEM, THING
  has specializers: CARTESIANSYSTEM, VIEWSYSTEM
  roles:
    (Name of COORDINATESYSTEM)
      ValDescs = (STRINGP)

```

```
Number = 1
Modality = Optional
(Exit of COORDINATESYSTEM)
ValDescs = (MAPPING)
Number = (0 NIL)
Modality = Optional
(Entry of COORDINATESYSTEM)
ValDescs = (MAPPING)
Number = (0 NIL)
Modality = Optional
(Dimensionality of COORDINATESYSTEM)
ValDescs = (NUMBERP)
Number = 1
Modality = Obligatory
is role value of ((** From 5) of LINEARTRANSFORM),
((** To 8) of LINEARTRANSFORM)
```

[110]

```
PHYSOBJECT
type: Generic
specializes: THING
has specializers: VEHICLE, PLATFORM, SHIP, SUB, PLANE,
FRIENDLYSHIP, ENEMYSHIP,
UNKNOWNSHIP, FRIENDLYSUB, ENEMYSUB,
UNKNOWNSUB, FRIENDLYPLANE,
ENEMYPLANE, UNKNOWNPLANE

roles:
Position
ValDescs = (PLACE)
Number = 1
Modality = Optional
Name
ValDescs = (STRINGP)
Number = 1
Modality = Optional
has meta descriptions:
[in Context AIPSDOMAINMETA]
ROLE#101
type: Individual
individuates: ROLE
meta-describes:
RoleSet Name in Context AIPSDOMAINMETA
[111]
```

```
INTERVALUNIT
type: Generic
specializes: UNIT, THING
roles:
(** Subject 5) ((Subject of UNIT))
ValDescs = (THING)
```

```

Number = 1
Modality = Optional
is role value of ((** Unit 6) of INTERVAL),
(IntervalUnit of SPEEDUNIT)

```

[112]

```

CARTESIANSYSTEM
type: Generic
specializes: 2DCOORDINATESYSTEM, ORTHOGONALSYSTEM,
COORDINATESYSTEM, THING
has specializer: VIEWSYSTEM
roles:
  ((** Dimensionality 4) of 2DCOORDINATESYSTEM) (
(Dimensionality of COORDINATESYSTEM))
  ValDescs = (2, NUMBERP)
  Number = 1
  Modality = Obligatory
  (Name of COORDINATESYSTEM)
  ValDescs = (STRINGP)
  Number = 1
  Modality = Optional
  (Exit of COORDINATESYSTEM)
  ValDescs = (MAPPING)
  Number = (0 NIL)
  Modality = Optional
  (Entry of COORDINATESYSTEM)
  ValDescs = (MAPPING)
  Number = (0 NIL)
  Modality = Optional
  is role value of ((** From 6) of 2DLINEARTRANSFORM),
  ((** To 9) of 2DLINEARTRANSFORM),
  (CoordSys of DISPLAYCOMPOSITE),
  ((** DomainCoordSys 4) of RECTANGULARMAP)

  ((** Continuum 6) of RECTANGULARREGION)

```

[113]

```

INTERVAL
type: Generic
specializes: METRIC, THING
roles:
  (** Unit 7) ((Unit of METRIC))
  ValDescs = (THING)
  Number = 1
  Modality = Optional
  (Magnitude of METRIC)
  ValDescs = (THING)
  Number = 1

```

```
  Modality = Optional
  is role value of (** Subject 5) of INTERVALUNIT
```

[114]

IROLE

```
  type: Generic
  specializes: THING
```

[115]

LINEARTRANSFORM

```
  type: Generic
  specializes: MAPPING, THING
  has specializers: 2DLINEARTRANSFORM, 2DLINEARTRANSFIX,
                    TRANSLATION, TRANSFIX
```

roles:

```
  (** From 5) ((From of MAPPING))
  ValDescs = (ORTHOGONALSYSTEM)
  Number = (1 NIL)
  Modality = Obligatory
  (** To 8) ((To of MAPPING))
  ValDescs = (ORTHOGONALSYSTEM)
  Number = (1 NIL)
  Modality = Obligatory
```

Origin

```
  ValDescs = (LISTP)
  Number = 1
  Modality = Optional
```

UnitVector

```
  ValDescs = (LISTP)
  Number = 1
  Modality = Optional
```

[116]

ROLE

```
  type: Generic
  specializes: THING
```

```
  has individuators: ROLE#23, ROLE#25, ROLE#28, ROLE#32,
                     ROLE#33, ROLE#34, ROLE#35, ROLE#36,
                     ROLE#37, ROLE#41, ROLE#42, ROLE#43,
                     ROLE#44, ROLE#45, ROLE#49, ROLE#50,
                     ROLE#51, ROLE#52, ROLE#56, ROLE#57,
                     ROLE#58, ROLE#59, ROLE#63, ROLE#64,
                     ROLE#65, ROLE#66, ROLE#70, ROLE#71,
                     ROLE#72, ROLE#73, ROLE#77, ROLE#78,
                     ROLE#79, ROLE#80, ROLE#84, ROLE#85,
                     ROLE#86, ROLE#87, ROLE#91, ROLE#92,
                     ROLE#93, ROLE#94, ROLE#98, ROLE#99,
                     ROLE#100, ROLE#101
```

```
  is role value of (RoleGroup of TEMPLATE)
```

[117]

UNIT
type: Generic
specializes: THING
has specializers: DISTANCEUNIT, INTERVALUNIT,
SPEEDUNIT
roles:
Subject
ValDescs = (THING)
Number = 1
Modality = Optional
is role value of (Unit of METRIC)

[118]

ICONCEPT
type: Generic
specializes: THING
is role value of (** ConceptGroup 4) of ITEMPLATE)

[119]

LEGENDTABLE
type: Generic
specializes: THING
is role value of (Table of MAPLEGEND)

[120]

DISTANCEUNIT
type: Generic
specializes: UNIT, THING
roles:
(** Subject 6) ((Subject of UNIT))
ValDescs = (THING)
Number = 1
Modality = Optional
is role value of (** Unit 8) of DISTANCE),
(DistanceUnit of SPEEDUNIT),
(ScaleUnit of RECTANGULARMAP)

[121]

CONCEPT
type: Generic
specializes: THING
has individuators: CONCEPT#22, CONCEPT#24, CONCEPT#29,
CONCEPT#30, CONCEPT#31, CONCEPT#40,
CONCEPT#48, CONCEPT#55, CONCEPT#62,

CONCEPT#69, CONCEPT#76, CONCEPT#83,
CONCEPT#90, CONCEPT#97,
CONCEPT#103
is role value of (ConceptGroup of TEMPLATE)

[122]

METRIC
type: Generic
specializes: THING
has specializers: DISTANCE, INTERVAL, SPEED
roles:
 Magnitude
 ValDescs = (THING)
 Number = 1
 Modality = Optional
 Unit
 ValDescs = (THING)
 Number = 1
 Modality = Optional
is role value of (Subject of UNIT)

[123]

DEFAULTVALUE
type: Generic
specializes: THING

[124]

VIEWSYSTEM
type: Generic
specializes: INTEGERSYSTEM, CARTESIANSYSTEM,
2DCOORDINATESYSTEM, ORTHOGONALSYSTEM,
COORDINATESYSTEM, THING
roles:
 (** Dimensionality 4) of 2DCOORDINATESYSTEM) (
(Dimensionality of COORDINATESYSTEM))
 ValDescs = (2, NUMBERP)
 Number = 1
 Modality = Obligatory
(Name of COORDINATESYSTEM)
 ValDescs = (STRINGP)
 Number = 1
 Modality = Optional
(Exit of COORDINATESYSTEM)
 ValDescs = (MAPPING)
 Number = (0 NIL)
 Modality = Optional
(Entry of COORDINATESYSTEM)

```
ValDescs = (MAPPING)
Number = (0 NIL)
Modality = Optional
is role value of ((** To 10) of 2DLINEARTRANSFIX),
  ((** Continuum 7) of DISPLAYSURFACE)
```

[125]

THING

```
type: Generic
has specializers: DEFAULT, DEFAULTVALUE, LISPDATA,
ATOM, LISTP, STRINGP, NUMBERP,
LITATOM, FIXP, FLOATP, SMALLP,
CONCEPT, ICONCEPT, ROLE, IROLE,
ABSTRACTION, DISPLAYITEM,
COORDINATESYSTEM, MAPPING,
PHYSOBJECT, PLACE, TIME, METRIC,
UNIT, LINE, PRESENTATION, TEMPLATE,
MAPSCALE, LEGENDTABLE,
NTDSSTRENGTHMARK, WINDOW,
DISPLAYITEMABSTRACTION, DISPLAYFORM,
MOTILEDISPLAYITEM,
STABILEDISPLAYITEM, INTEGERSYSTEM,
2DCOORDINATESYSTEM,
ORTHOGONALSYSTEM, TIMESYSTEM,
LINEARTRANSFORM, VEHICLE, POSITION,
REGION, DISTANCE, INTERVAL, SPEED,
DISTANCEUNIT, INTERVALUNIT,
SPEEDUNIT, DISPLAY, ITEMPLATE,
DISPLAYABSTRACTION, DISPLAYATOM,
DISPLAYCOMPOSITE, CARTESIANSYSTEM,
2DLINEARTRANSFORM, PLATFORM, SHIP,
SUB, PLANE, HOMOGENEOUSREGION, TEXT,
ARRANGEMENT, MAP, MAPITEM, MAPGRID,
NTDSENGAGEMENTMARK,
NTDSVELOCITYLEADER, POINT, EDGESET,
CURVE, VIEWSYSTEM, 2DLINEARTRANSFIX,
TRANSLATION, FRIENDLYSHIP,
ENEMYSHIP, UNKNOWNSHIP, FRIENDLYSUB,
ENEMYSUB, UNKNOWNSUB, FRIENDLYPLANE,
ENEMYPLANE, UNKNOWNPLANE,
RECTANGULARREGION, ROW, COLUMN,
TABLE, MAPLEGEND, RECTANGULARMAP,
MAPWITHBACKGROUND, NTDSITEM,
NARROWNTDSENGAGEMENTMARK,
LINESEGMENT, CLOSEDCURVE, TRANSFIX,
VIEWSURFACE, TEXTROW, TEXTCOLUMN,
ROWTABLE, COLUMNTABLE, NTDSMAP,
FRIENDLYNTDSSHIP, FRIENDLYNTDSPLANE,
FRIENDLYNTDSSUB, ENEMYNTDSSHIP,
ENEMYNTDSSUB, ENEMYNTDSPLANE,
```

UNKNOWNNTDSSHIP, UNKNOWNNTDSSUB,
UNKNOWNNTDSPLANE, ELLIPSE, POLYGON,
DISPLAYSURFACE, CIRCLE,
REGULARPOLYGON, RECTANGLE,
VISIBLESURFACE, INVISIBLESURFACE
has individuators: MAPIAPL1, MAPIAPL2, MAPITEMIAPL1,
NTDSITEMIAPL1,
FRIENDLYNTDSSHIPIAPL1,
FRIENDLYNTDSPLANEIAPL1,
FRIENDLYNTDSSUBIAPL1,
ENEMYNTDSSHIPIAPL1,
ENEMYNTDSSUBIAPL1,
ENEMYNTDSPLANEIAPL1,
UNKNOWNNTDSSHIPIAPL1,
UNKNOWNNTDSSUBIAPL1,
UNKNOWNNTDSPLANEIAPL1,
NTDSENGAGEMENTMARKIAPL1,
NTDSVELOCITYLEADERIAPL1,
CONCEPT#22, CONCEPT#24, CONCEPT#29,
CONCEPT#30, CONCEPT#31, CONCEPT#40,
CONCEPT#48, CONCEPT#55, CONCEPT#62,
CONCEPT#69, CONCEPT#76, CONCEPT#83,
CONCEPT#90, CONCEPT#97,
CONCEPT#103, ROLE#23, ROLE#25,
ROLE#28, ROLE#32, ROLE#33, ROLE#34,
ROLE#35, ROLE#36, ROLE#37, ROLE#41,
ROLE#42, ROLE#43, ROLE#44, ROLE#45,
ROLE#49, ROLE#50, ROLE#51, ROLE#52,
ROLE#56, ROLE#57, ROLE#58, ROLE#59,
ROLE#63, ROLE#64, ROLE#65, ROLE#66,
ROLE#70, ROLE#71, ROLE#72, ROLE#73,
ROLE#77, ROLE#78, ROLE#79, ROLE#80,
ROLE#84, ROLE#85, ROLE#86, ROLE#87,
ROLE#91, ROLE#92, ROLE#93, ROLE#94,
ROLE#98, ROLE#99, ROLE#100,
ROLE#101, MAPIAPL1, MAPIAPL2,
MAPITEMIAPL1, NTDSITEMIAPL1,
FRIENDLYNTDSSHIPIAPL1,
FRIENDLYNTDSPLANEIAPL1,
FRIENDLYNTDSSUBIAPL1,
ENEMYNTDSSHIPIAPL1,
ENEMYNTDSSUBIAPL1,
ENEMYNTDSPLANEIAPL1,
UNKNOWNNTDSSHIPIAPL1,
UNKNOWNNTDSSUBIAPL1,
UNKNOWNNTDSPLANEIAPL1,
NTDSENGAGEMENTMARKIAPL1,
NTDSVELOCITYLEADERIAPL1, TEXTABSTR,
MAPABSTR, MAPITEMABSTR,
NTDSITEMABSTR,
FRIENDLYNTDSSHIPABSTR,

```

FRIENDLYNTDSPLANEABSTR,
FRIENDLYNTDSSUBABSTR,
ENEMYNTDSSHIPABSTR,
ENEMYNTDSSUBABSTR,
ENEMYNTDSPLANEABSTR,
UNKNOWNNTDSSHIPABSTR,
UNKNOWNNTDSSUBABSTR,
UNKNOWNNTDSPLANEABSTR,
NTDSENGAGEMENTMARKABSTR,
NARROWNTDSENGAGEMENTMARKABSTR,
NTDSVELOCITYLEADERABSTR, POINT#39,
POINT#47, POINT#54, POINT#61,
POINT#68, POINT#75, POINT#82,
POINT#89, POINT#96, EDGESET#46,
EDGESET#53, EDGESET#60, EDGESET#67,
EDGESET#74, EDGESET#81, EDGESET#88,
EDGESET#95, LINESEGMENT#26,
LINESEGMENT#27, LINESEGMENT#102,
LINESEGMENT#104, CIRCLE#38
is role value of (Constraint of PLACE),
(Constraint of TIME),
(Realization of PRESENTATION)

```

[126]

```

DISTANCE
type: Generic
specializes: METRIC, THING
roles:
  (** Unit 8) ((Unit of METRIC))
  ValDescs = (THING)
  Number = 1
  Modality = Optional
  (Magnitude of METRIC)
  ValDescs = (THING)
  Number = 1
  Modality = Optional
is role value of (** Subject 6) of DISTANCEUNIT)

```

[127]

```

MAPSCALE
type: Generic
specializes: THING
is role value of (ScaleIkon of MAPLEGEND)

```

[128]

```

ARRANGEMENT
type: Generic
specializes: DISPLAY, PRESENTATION, DISPLAYITEM,

```

```
THING
has specializers: ROW, COLUMN, TABLE, MAPLEGEND,
TEXTROW, TEXTCOLUMN, ROWTABLE,
COLUMNTABLE
roles:
  Item ((Realization of PRESENTATION))
    ValDescs = (DISPLAYITEM)
    Number = (2 NIL)
    Modality = Obligatory
  ItemOrder
    ValDescs = (LISTP)
    Number = 1
    Modality = Optional
  Border ((Realization of PRESENTATION))
    ValDescs = (CLOSEDCURVE)
    Number = 1
    Modality = Optional
  Separator ((Realization of PRESENTATION))
    ValDescs = (DISPLAYITEM)
    Number = (0 NIL)
    Modality = Optional
  (** Realization 8) of DISPLAY) (
    (Realization of PRESENTATION)
      ValDescs = (DISPLAYITEM)
      Number = (0 NIL)
      Modality = Optional
    (Ground of DISPLAY)
      ValDescs = (VIEWSURFACE)
      Number = 1
      Modality = Obligatory
    (Name of DISPLAY)
      ValDescs = (STRINGP)
      Number = 1
      Modality = Optional
    (Application of PRESENTATION)
      ValDescs = (THING)
      Number = (0 NIL)
      Modality = Optional
    (Location of DISPLAYITEM)
      ValDescs = (LISTP)
      Number = 1
      Modality = Optional
      has attached IData:
        (DefaultFiller NIL)
          (LIST 0 0)
    (Size of DISPLAYITEM)
      ValDescs = (NUMBERP)
      Number = 1
      Modality = Optional
      has attached IData:
```

```

(DefaultFiller NIL)
  1
(Orientation of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
(Width of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
(Height of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
(Envelope of DISPLAYITEM)
  ValDescs = (CLOSEDCURVE)
  Number = 1
  Modality = Optional
is role value of (Group of TABLE)

```

[129]

```

LINESEGMENT
  type: Generic
  specializes: CURVE, DISPLAYATOM, DISPLAYFORM,
    DISPLAYITEM, THING
  has individuators: LINESEGMENT#26, LINESEGMENT#27,
    LINESEGMENT#102, LINESEGMENT#104
  roles:
   EndPoint ((Location of DISPLAYITEM))
      ValDescs = (LISTP)
      Number = 2
      Modality = Optional
      has attached IData:
        (DefaultFiller NIL)
          (LIST 0 0)
    Line
      ValDescs = (LINE)
      Number = 1
      Modality = Optional
      has attached IData:
        (Derivation DeriveLineEquationFromEndpoints)
          ((Prerequisites EndPoint))
  (Approximation of CURVE)
    ValDescs = (EDGESET)
    Number = 1
    Modality = Optional
  (Size of DISPLAYITEM)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional

```

```
has attached IData:  
  (DefaultFiller NIL)  
  1  
(Orientation of DISPLAYITEM)  
  ValDescs = (NUMBERP)  
  Number = 1  
  Modality = Optional  
(Width of DISPLAYITEM)  
  ValDescs = (NUMBERP)  
  Number = 1  
  Modality = Optional  
(Height of DISPLAYITEM)  
  ValDescs = (NUMBERP)  
  Number = 1  
  Modality = Optional  
(Envelope of DISPLAYITEM)  
  ValDescs = (CLOSEDCURVE)  
  Number = 1  
  Modality = Optional  
is role value of (Side of POLYGON),  
  (Leader of NTDSVELOCITYLEADER)
```

[130]

```
MAPITEMIAPL1  
type: Individual  
individuates: TEMPLATE, THING  
roles:  
  (** IRole 278) ((ConceptGroup of TEMPLATE))  
  ValDescs = (CONCEPT#22)  
  (** IRole 280) ((RoleGroup of TEMPLATE))  
  ValDescs = (ROLE#23)  
  (** IRole 264) ((RoleGroup of TEMPLATE))  
  ValDescs = (ROLE#28)  
is role value of (** IRole 281) of MAPITEMABSTR)
```

[131]

```
MAPITEMABSTR  
type: Individual  
individuates: DISPLAYABSTRACTION,  
  DISPLAYITEMABSTRACTION, ABSTRACTION,  
  THING  
roles:  
  (** IRole 281) (  
    (IntendedApplication of DISPLAYABSTRACTION))  
    ValDescs = (MAPITEMIAPL1)  
  (** IRole 274) (  
    (FixedComponent of DISPLAYITEMABSTRACTION))
```

```

    ValDescs = (LINESEGMENT#26)
    (** IRole 282) (
(FixedComponent of DISPLAYITEMABSTRACTION))
    ValDescs = (LINESEGMENT#27)
    (InformationRequirement of DISPLAYABSTRACTION)
    ValDescs = (TEMPLATE)
    Number = (1 NIL)
    Modality = Optional

```

[132]

```

MAPIAPL1
  type: Individual
  individuates: TEMPLATE, THING
  roles:
    (** IRole 283) ((ConceptGroup of TEMPLATE))
    ValDescs = (CONCEPT#22)
    (** IRole 279) ((RoleGroup of TEMPLATE))
    ValDescs = (ROLE#23)
  is role value of (** IRole 284) of MAPABSTR)

```

[133]

```

RECTANGULARMAP
  type: Generic
  specializes: MAP, DISPLAY, PRESENTATION, DISPLAYITEM,
  THING
  has specializer: NTDSMAP
  roles:
    (** DomainCoordSys 4) ((DomainCoordSys of MAP))
    ValDescs = (CARTESIANSYSTEM)
    Number = 1
    Modality = Optional
    has attached IData:
      (Derivation FindDomainCoordinateSystem)
        [(Prerequisites EntityList)
         (Arguments
          (CAR (CKLFindNode $$CONCEPT
          EntityList)))
        (KLFindVRsOfRole
          (KLFindOneNamedGenericRole
            $$CONCEPT
            (QUOTE DomainCoordSys)
        (FillWhenMade NIL)
        T
    (** MapItemTransform 5) ((MapItemTransform of MAP))
    ValDescs = (2DLINEARTRANSFORM)
    Number = 1
    Modality = Obligatory
    ScaleUnit
    ValDescs = (DISTANCEUNIT)

```

```
Number = 1
Modality = Optional
ScaleDistance
ValDescs = (NUMBERP)
Number = 1
Modality = Optional
(** Border 6) ((Border of MAP),
                (Realization of PRESENTATION))
ValDescs = (RECTANGLE)
Number = 1
Modality = Optional
(** Ground 10) ((Ground of DISPLAY))
ValDescs = (VIEWSURFACE)
Number = 1
Modality = Obligatory
has attached IData:
(Derivation Prerequisites)
(MapItemTransform)
(EntityList of MAP)
ValDescs = (LISTP)
Number = 1
Modality = Optional
((** Name 4) of MAP) ((Name of DISPLAY))
ValDescs = (STRINGP)
Number = 1
Modality = Obligatory
has attached IData:
(FillWhenMade NIL)
T
(Label of MAP) ((Realization of PRESENTATION))
ValDescs = (TEXT)
Number = 1
Modality = Optional
has attached IData:
(Derivation MakeMapLabel)
  [(Prerequisites Name Ground)
   (Arguments
     (CAR (CKLFindNode $$CONCEPT
                           Name))
     (CAR (CKLFindNode $$CONCEPT
                           Ground))
   )
  ]
(FillWhenMade NIL)
T
(Legend of MAP) ((Realization of PRESENTATION))
ValDescs = (MAPLEGEND)
Number = 1
Modality = Optional
has attached IData:
(Derivation MakeSimpleMapLegend)
  ((Prerequisites Name Item)
   (Arguments
```

```
(CAR (CKLFindNode $$CONCEPT
  Name))
  (CKLFindNode $$CONCEPT Item)))
(FillWhenMade NIL)
  T
(ReferenceGrid of MAP) (
  (Realization of PRESENTATION))
    ValDescs = (MAPGRID)
    Number = 1
    Modality = Optional
  (Item of MAP) ((Realization of PRESENTATION))
    ValDescs = (MAPITEM)
    Number = (1 NIL)
    Modality = Obligatory
    has attached IData:
      (Derivation MakeMapItems)
        [(Prerequisites EntityList
          Application Ground)
         (Arguments
           (CKLFindNode $$CONCEPT
             Application)
           (CAR (CKLFindNode $$CONCEPT
             EntityList))
           (CAR (CKLFindNode $$CONCEPT
             Ground))
        (FillWhenMade NIL)
          T
        (** Realization 8) of DISPLAY) (
          (Realization of PRESENTATION))
            ValDescs = (DISPLAYITEM)
            Number = (0 NIL)
            Modality = Optional
          (Application of PRESENTATION)
            ValDescs = (THING)
            Number = (0 NIL)
            Modality = Optional
          (Location of DISPLAYITEM)
            ValDescs = (LISTP)
            Number = 1
            Modality = Optional
            has attached IData:
              (DefaultFiller NIL)
                (LIST 0 0)
          (Size of DISPLAYITEM)
            ValDescs = (NUMBERP)
            Number = 1
            Modality = Optional
            has attached IData:
              (DefaultFiller NIL)
```

1
(Orientation of DISPLAYITEM)
 ValDescs = (NUMBERP)
 Number = 1
 Modality = Optional
(Width of DISPLAYITEM)
 ValDescs = (NUMBERP)
 Number = 1
 Modality = Optional
(Height of DISPLAYITEM)
 ValDescs = (NUMBERP)
 Number = 1
 Modality = Optional
(Envelope of DISPLAYITEM)
 ValDescs = (CLOSEDCURVE)
 Number = 1
 Modality = Optional

[134]

MAPIAPL2
 type: Individual
 individuates: TEMPLATE, THING
 roles:
 (** IRole 285) ((ConceptGroup of TEMPLATE))
 ValDescs = (CONCEPT#24)
 (** IRole 275) ((RoleGroup of TEMPLATE))
 ValDescs = (ROLE#25)
 is role value of (** IRole 286) of MAPABSTR)

[135]

LISTP
 type: Generic
 specializes: THING
 is role value of (Location of DISPLAYITEM),
 (Origin of LINEARTRANSFORM),
 (UnitVector of LINEARTRANSFORM),
 (Location of POSITION),
 (VertexList of EDGESET),
 (ItemOrder of ARRANGEMENT),
 (EntityList of TABLE),
 (ThemeList of TABLE),
 (EntityList of MAP)

[136]

LITATOM
 type: Generic
 specializes: THING

[137]

NUMBERP

type: Generic
specializes: THING
is role value of (Size of DISPLAYITEM),
 (Orientation of DISPLAYITEM),
 (Width of DISPLAYITEM),
 (Height of DISPLAYITEM),
 (Dimensionality of COORDINATESYSTEM),
 (Course of VEHICLE),
 (Height of REGION),
 (Width of REGION),
 (Magnitude of METRIC),
 (Order of POLYGON),
 (ScaleDistance of RECTANGULARMAP)

[138]

FIXP

type: Generic
specializes: THING

[139]

SMALLP

type: Generic
specializes: THING
is role value of (LineSpacing of TEXT),
 (Background of DISPLAYSURFACE)

[140]

STRINGP

type: Generic
specializes: THING
is role value of (Name of COORDINATESYSTEM),
 (Name of PHYSOBJECT),
 (Name of DISPLAY), (String of TEXT)

[141]

MAPITEM

type: Generic
specializes: DISPLAY, PRESENTATION, DISPLAYITEM,
 THING
has specializers: NTDSITEM, FRIENDLYNTDSSHIP,
 FRIENDLYNTDSPANE, FRIENDLYNTDSSUB,
 ENEMYNTDSSHIP, ENEMYNTDSSUB,
 ENEMYNTDSPANE, UNKNOWNNTDSSHIP,
 UNKNOWNNTDSSUB, UNKNOWNNTDSPANE
has abstraction: MAPITEMABSTR

```
roles:
  (** Application 8) ((Application of PRESENTATION))
  ValDescs = (THING)
  Number = (0 NIL)
  Modality = Optional
  Label ((Realization of PRESENTATION))
  ValDescs = (TEXT)
  Number = 1
  Modality = Optional
  has attached IData:
    (Derivation MakeMapItemLabel?)
      [(Prerequisites Application Ground)
       (Arguments
         (CAR (CKLFindNode $$CONCEPT
                           Application))
         (CAR (CKLFindNode $$CONCEPT
                           Ground))
       (FillWhenMade NIL)
       T
      ((** Realization 8) of DISPLAY) (
        (Realization of PRESENTATION)
          ValDescs = (DISPLAYITEM)
          Number = (0 NIL)
          Modality = Optional
        (Ground of DISPLAY)
          ValDescs = (VIEWSURFACE)
          Number = 1
          Modality = Obligatory
        (Name of DISPLAY)
          ValDescs = (STRINGP)
          Number = 1
          Modality = Optional
        (Location of DISPLAYITEM)
          ValDescs = (LISTP)
          Number = 1
          Modality = Optional
          has attached IData:
            (DefaultFiller NIL)
              (LIST 0 0)
        (Size of DISPLAYITEM)
          ValDescs = (NUMBERP)
          Number = 1
          Modality = Optional
          has attached IData:
            (DefaultFiller NIL)
              1
        (Orientation of DISPLAYITEM)
          ValDescs = (NUMBERP)
          Number = 1
          Modality = Optional
```

```

(Width of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
(Height of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
(Envelope of DISPLAYITEM)
  ValDescs = (CLOSEDCURVE)
  Number = 1
  Modality = Optional
is role value of (Item of MAP)
has attached IData:
  (ToDraw NIL)  TDDisplay
  (ToLocate NIL)  TLDisplay  TLDisplayItem

```

[142]

```

MAPLEGEND
  type: Generic
  specializes: ARRANGEMENT, DISPLAY, PRESENTATION,
               DISPLAYITEM, THING
  roles:
    ScaleIkon ((Item of ARRANGEMENT),
               (Realization of PRESENTATION))
    ValDescs = (MAPSCALE, DISPLAYITEM)
    Number = 1
    Modality = Optional
  Table ((Item of ARRANGEMENT),
         (Realization of PRESENTATION))
    ValDescs = (LEGENDTABLE, DISPLAYITEM)
    Number = 1
    Modality = Obligatory
  has attached IData:
    (Derivation MakeLegendTableFromApplication)
      ((Prerequisites Application)
       (Arguments (CKLFindNode $$CONCEPT
                  Application)))
    (FillWhenMade NIL)
      T
  Label ((Item of ARRANGEMENT),
         (Realization of PRESENTATION))
    ValDescs = (TEXT)
    Number = 1
    Modality = Obligatory
  has attached IData:
    (DefaultFiller NIL)
      (Make TEXT String "LEGEND")
  (Item of ARRANGEMENT) (
    (Realization of PRESENTATION))

```

```
ValDescs = (DISPLAYITEM)
Number = (2 NIL)
Modality = Obligatory
(ItemOrder of ARRANGEMENT)
ValDescs = (LISTP)
Number = 1
Modality = Optional
(Border of ARRANGEMENT) (

(Realization of PRESENTATION))
ValDescs = (CLOSEDCURVE)
Number = 1
Modality = Optional
(Separator of ARRANGEMENT) (

(Realization of PRESENTATION))
ValDescs = (DISPLAYITEM)
Number = (0 NIL)
Modality = Optional
((** Realization 8) of DISPLAY) (

(Realization of PRESENTATION))
ValDescs = (DISPLAYITEM)
Number = (0 NIL)
Modality = Optional
(Ground of DISPLAY)
ValDescs = (VIEWSURFACE)
Number = 1
Modality = Obligatory
(Name of DISPLAY)
ValDescs = (STRINGP)
Number = 1
Modality = Optional
(Application of PRESENTATION)
ValDescs = (THING)
Number = (0 NIL)
Modality = Optional
(Location of DISPLAYITEM)
ValDescs = (LISTP)
Number = 1
Modality = Optional
has attached IData:
  (DefaultFiller NIL)
    (LIST 0 0)
(Size of DISPLAYITEM)
ValDescs = (NUMBERP)
Number = 1
Modality = Optional
has attached IData:
  (DefaultFiller NIL)
    1
```

```
(Orientation of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
(Width of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
(Height of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
(Envelope of DISPLAYITEM)
  ValDescs = (CLOSEDCURVE)
  Number = 1
  Modality = Optional
is role value of (Legend of MAP)
```

[143]

```
MAPGRID
  type: Generic
  specializes: DISPLAY, PRESENTATION, DISPLAYITEM,
              THING
  roles:
    ReferenceLine ((Realization of PRESENTATION))
      ValDescs = (CURVE)
      Number = (4 NIL)
      Modality = Obligatory
    ReferenceLabel ((Realization of PRESENTATION))
      ValDescs = (TEXT)
      Number = (4 NIL)
      Modality = Obligatory
    ((** Realization 8) of DISPLAY) (
      (Realization of PRESENTATION))
        ValDescs = (DISPLAYITEM)
        Number = (0 NIL)
        Modality = Optional
      (Ground of DISPLAY)
        ValDescs = (VIEWSURFACE)
        Number = 1
        Modality = Obligatory
      (Name of DISPLAY)
        ValDescs = (STRINGP)
        Number = 1
        Modality = Optional
      (Application of PRESENTATION)
        ValDescs = (THING)
        Number = (0 NIL)
        Modality = Optional
```

```
(Location of DISPLAYITEM)
  ValDescs = (LISTP)
  Number = 1
  Modality = Optional
  has attached IData:
    (DefaultFiller NIL)
      (LIST 0 0)
(Size of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
  has attached IData:
    (DefaultFiller NIL)
      1
(Orientation of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
(Width of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
(Height of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
(Envelope of DISPLAYITEM)
  ValDescs = (CLOSEDCURVE)
  Number = 1
  Modality = Optional
is role value of (ReferenceGrid of MAP)
```

[144]

```
REGULARPOLYGON
  type: Generic
  specializes: POLYGON, DISPLAYCOMPOSITE, CLOSEDCURVE,
    CURVE, DISPLAYATOM, DISPLAYFORM,
    DISPLAYITEM, THING
  roles:
    Center ((Location of DISPLAYITEM))
      ValDescs = (LISTP)
      Number = 1
      Modality = Optional
      has attached IData:
        (DefaultFiller NIL)
          (LIST 0 0)
    Radius ((Size of DISPLAYITEM))
      ValDescs = (NUMBERP)
      Number = 1
      Modality = Optional
```

```

has attached IData:
  (DefaultFiller NIL)
  1
(** Orientation 2) ((Orientation of DISPLAYITEM))
  ValDescs = (THING)
  Number = 1
  Modality = Optional
(Order of POLYGON)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
(Side of POLYGON) ((Component of DISPLAYCOMPOSITE))
  ValDescs = (LINESEGMENT)
  Number = (3 NIL)
  Modality = Obligatory
(CoordSys of DISPLAYCOMPOSITE)
  ValDescs = (CARTESIANSYSTEM)
  Number = 1
  Modality = Optional
(Approximation of CURVE)
  ValDescs = (EDGESET)
  Number = 1
  Modality = Optional
(Width of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
(Height of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
(Envelope of DISPLAYITEM)
  ValDescs = (CLOSEDCURVE)
  Number = 1
  Modality = Optional

```

[145]

```

FLOATP
  type: Generic
  specializes: THING

```

[146]

```

POLYGON
  type: Generic
  specializes: DISPLAYCOMPOSITE, CLOSEDCURVE, CURVE,
               DISPLAYATOM, DISPLAYFORM, DISPLAYITEM,
               THING
  has specializers: REGULARPOLYGON, RECTANGLE
  roles:
    Order

```

```
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
(Side ((Component of DISPLAYCOMPOSITE))
    ValDescs = (LINESEGMENT)
    Number = (3 NIL)
    Modality = Obligatory
(CoordSys of DISPLAYCOMPOSITE)
    ValDescs = (CARTESIANSYSTEM)
    Number = 1
    Modality = Optional
(Approximation of CURVE)
    ValDescs = (EDGESET)
    Number = 1
    Modality = Optional
(Location of DISPLAYITEM)
    ValDescs = (LISTP)
    Number = 1
    Modality = Optional
    has attached IData:
        (DefaultFiller NIL)
            (LIST 0 0)
(Size of DISPLAYITEM)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
    has attached IData:
        (DefaultFiller NIL)
            1
(Orientation of DISPLAYITEM)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
(Width of DISPLAYITEM)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
(Height of DISPLAYITEM)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
(Envelope of DISPLAYITEM)
    ValDescs = (CLOSEDCURVE)
    Number = 1
    Modality = Optional
```

[147]

UNKNOWNSUB
type: Generic
specializes: SUB, PLATFORM, VEHICLE, PHYSOBJECT,
THING

```
roles:
  (** Ownership 10) ((Ownership of PLATFORM))
    ValDescs = (Unknown)
    Number = 1
    Modality = Optional
  ((** Medium 7) of SUB) ((Medium of VEHICLE))
    ValDescs = (SubSurface)
    Number = 1
    Modality = Optional
  (EngagementStatus of PLATFORM)
    ValDescs = (ATOM)
    Number = 1
    Modality = Optional
  has meta descriptions:
    [in Context AIPSDOMAINMETA]
      ROLE#100
        type: Individual
        individuates: ROLE
        meta-describes:
          RoleSet EngagementStatus in Context
AIPSDOMAINMETA
  (Course of VEHICLE)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
  has meta descriptions:
    [in Context AIPSDOMAINMETA]
      ROLE#35
        type: Individual
        individuates: ROLE
        meta-describes:
          RoleSet Course in Context AIPSDOMAINMETA
  (Speed of VEHICLE)
    ValDescs = (SPEED)
    Number = 1
    Modality = Optional
  has meta descriptions:
    [in Context AIPSDOMAINMETA]
      ROLE#44
        type: Individual
        individuates: ROLE
        meta-describes:
          RoleSet Speed in Context AIPSDOMAINMETA
  (Position of PHYSOBJECT)
    ValDescs = (PLACE)
    Number = 1
    Modality = Optional
  (Name of PHYSOBJECT)
    ValDescs = (STRINGP)
    Number = 1
    Modality = Optional
```

```
has meta descriptions:  
  [in Context AIPSDOMAINMETA]  
    ROLE#101  
      type: Individual  
      individuates: ROLE  
      meta-describes:  
        RoleSet Name  in Context AIPSDOMAINMETA  
has meta descriptions:  
  [in Context AIPSDOMAINMETA]  
    CONCEPT#90  
      type: Individual  
      individuates: CONCEPT  
      meta-describes:  
        Concept UNKNOWNSUB  in Context AIPSDOMAINMETA  
[148]
```

```
MAPABSTR  
  type: Individual  
  individuates: DISPLAYABSTRACTION,  
    DISPLAYITEMABSTRACTION, ABSTRACTION,  
    THING  
has schema: MAP  
roles:  
  (** IRole 287) (  
  
(IntendedApplication of DISPLAYABSTRACTION)  
  ValDescs = (MAPIAPL1)  
  (** IRole 286) (  
  
(IntendedApplication of DISPLAYABSTRACTION)  
  ValDescs = (MAPIAPL2)  
  (InformationRequirement of DISPLAYABSTRACTION)  
    ValDescs = (TEMPLATE)  
    Number = (1 NIL)  
    Modality = Optional  
  (FixedComponent of DISPLAYITEMABSTRACTION)  
    ValDescs = (DISPLAYFORM)  
    Number = (1 NIL)  
    Modality = Optional
```

[149]

```
ATOM  
  type: Generic  
  specializes: THING  
  is role value of (Medium of VEHICLE),  
    (EngagementStatus of PLATFORM),  
    (Ownership of PLATFORM)
```

[150]

UNKNOWNSHIP

```
type: Generic
specializes: SHIP, PLATFORM, VEHICLE, PHYSOBJECT,
             THING
roles:
  (** Ownership 11) ((Ownership of PLATFORM))
    ValDescs = (Unknown)
    Number = 1
    Modality = Optional
  (** Medium 8) of SHIP ((Medium of VEHICLE))
    ValDescs = (Surface)
    Number = 1
    Modality = Optional
  (EngagementStatus of PLATFORM)
    ValDescs = (ATOM)
    Number = 1
    Modality = Optional
  has meta descriptions:
    [in Context AIPSDOMAINMETA]
      ROLE#100
        type: Individual
        individuates: ROLE
        meta-describes:
          RoleSet EngagementStatus in Context
AIPSDOMAINMETA
  (Course of VEHICLE)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
  has meta descriptions:
    [in Context AIPSDOMAINMETA]
      ROLE#35
        type: Individual
        individuates: ROLE
        meta-describes:
          RoleSet Course in Context AIPSDOMAINMETA
  (Speed of VEHICLE)
    ValDescs = (SPEED)
    Number = 1
    Modality = Optional
  has meta descriptions:
    [in Context AIPSDOMAINMETA]
      ROLE#44
        type: Individual
        individuates: ROLE
        meta-describes:
          RoleSet Speed in Context AIPSDOMAINMETA
  (Position of PHYSOBJECT)
    ValDescs = (PLACE)
    Number = 1
    Modality = Optional
  (Name of PHYSOBJECT)
```

```
ValDescs = (STRINGP)
Number = 1
Modality = Optional
has meta descriptions:
  [in Context AIPSDOMAINMETA]
  ROLE#101
    type: Individual
    individuates: ROLE
    meta-describes:
      RoleSet Name    in Context AIPSDOMAINMETA
      [151]

UNKNOWNPLANE
  type: Generic
  specializes: PLANE, PLATFORM, VEHICLE, PHYSOBJECT,
    THING
  roles:
    (** Ownership 12) ((Ownership of PLATFORM))
    ValDescs = (Unknown)
    Number = 1
    Modality = Optional
    ((** Medium 9) of PLANE) ((Medium of VEHICLE))
    ValDescs = (Air)
    Number = 1
    Modality = Optional
    (EngagementStatus of PLATFORM)
    ValDescs = (ATOM)
    Number = 1
    Modality = Optional
    has meta descriptions:
      [in Context AIPSDOMAINMETA]
      ROLE#100
        type: Individual
        individuates: ROLE
        meta-describes:
          RoleSet EngagementStatus    in Context
AIPSDOMAINMETA
  (Course of VEHICLE)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
  has meta descriptions:
    [in Context AIPSDOMAINMETA]
    ROLE#35
      type: Individual
      individuates: ROLE
      meta-describes:
        RoleSet Course    in Context AIPSDOMAINMETA
  (Speed of VEHICLE)
  ValDescs = (SPEED)
  Number = 1
```

```

Modality = Optional
has meta descriptions:
  [in Context AIPSDOMAINMETA]
  ROLE#44
    type: Individual
    individuates: ROLE
    meta-describes:
      RoleSet Speed  in Context AIPSDOMAINMETA
  (Position of PHYSOBJECT)
  ValDescs = (PLACE)
  Number = 1
  Modality = Optional
  (Name of PHYSOBJECT)
  ValDescs = (STRINGP)
  Number = 1
  Modality = Optional
  has meta descriptions:
    [in Context AIPSDOMAINMETA]
    ROLE#101
      type: Individual
      individuates: ROLE
      meta-describes:
        RoleSet Name  in Context AIPSDOMAINMETA
  has meta descriptions:
  [in Context AIPSDOMAINMETA]
  CONCEPT#97
    type: Individual
    individuates: CONCEPT
    meta-describes:
      Concept UNKNOWNPLANE  in Context AIPSDOMAINMETA
                                         [152]

```

```

TRANSLATION
  type: Generic
  specializes: 2DLINEARTRANSFORM, LINEARTRANSFORM,
    MAPPING, THING
  has specializer: TRANSPX
  roles:
    (** UnitVector 4) ((UnitVector of LINEARTRANSFORM))
    ValDescs = ((1 1))
    Number = 1
    Modality = Optional
    (** From 6) of 2DLINEARTRANSFORM) (
      (From of MAPPING))
      ValDescs = (CARTESIANSYSTEM)
      Number = (1 NIL)
      Modality = Obligatory
      (** To 9) of 2DLINEARTRANSFORM) ((To of MAPPING))
      ValDescs = (CARTESIANSYSTEM)
      Number = (1 NIL)

```

Modality = Obligatory
(Origin of LINEARTRANSFORM)
ValDescs = (LISTP)
Number = 1
Modality = Optional

[153]

LINESEGMENT#102
type: Individual
individuates: LINESEGMENT, CURVE, DISPLAYATOM,
DISPLAYFORM, DISPLAYITEM, THING
roles:
(** IRole 288) ((EndPoint of LINESEGMENT),
 (Location of DISPLAYITEM))
ValDescs = ((-6 0))
has attached IData:
 (DefaultFiller NIL)
 (LIST 0 0)
(** IRole 289) ((EndPoint of LINESEGMENT),
 (Location of DISPLAYITEM))
ValDescs = ((6 0))
has attached IData:
 (DefaultFiller NIL)
 (LIST 0 0)
(Line of LINESEGMENT)
ValDescs = (LINE)
Number = 1
Modality = Optional
has attached IData:
 (Derivation DeriveLineEquationFromEndpoints)
 ((Prerequisites EndPoint))
(Approximation of CURVE)
ValDescs = (EDGESET)
Number = 1
Modality = Optional
(Size of DISPLAYITEM)
ValDescs = (NUMBERP)
Number = 1
Modality = Optional
has attached IData:
 (DefaultFiller NIL)
 1
(Orientation of DISPLAYITEM)
ValDescs = (NUMBERP)
Number = 1
Modality = Optional
(Width of DISPLAYITEM)
ValDescs = (NUMBERP)
Number = 1
Modality = Optional
(Height of DISPLAYITEM)

```
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
    (Envelope of DISPLAYITEM)
    ValDescs = (CLOSEDCURVE)
    Number = 1
    Modality = Optional
    is role value of

((** IRole 290) of NTDSENGAGEMENTMARKABSTR)
    has attached IData:
        (ToDraw NIL)    TDLineSegment TDCurve
        (ToErase NIL)   TEDisplayAtom
        (ToLocate NIL)  TLDisplayAtom TLDisplayItem
```

[154]

```
ROLE#101
    type: Individual
    individuates: ROLE, THING
    meta-describes:
        RoleSet Name    in Context AIPSDOMAINMETA
    is role value of

((** IRole 291) of UNKNOWNNTDSPLANEIAPL1)
```

[155]

```
VISIBLESURFACE
    type: Generic
    specializes: DISPLAYSURFACE, VIEWSURFACE,
                  RECTANGULARREGION, HOMOGENEOUSREGION,
                  REGION, PLACE, THING
    roles:
        (DisplayStream of DISPLAYSURFACE)
            ValDescs = (THING)
            Number = 1
            Modality = Obligatory
            has attached IData:
                (DefaultFiller NIL)
                    (DSPCREATE)
        (Background of DISPLAYSURFACE)
            ValDescs = (SMALLP)
            Number = 1
            Modality = Obligatory
            has attached IData:
                (DefaultFiller NIL)
                    0
        ((** Continuum 7) of DISPLAYSURFACE) (
            (Continuum of PLACE))
                ValDescs = (VIEWSYSTEM)
```

```
Number = 1
Modality = Optional
(Window of VIEWSURFACE)
ValDescs = (WINDOW)
Number = (0 NIL)
Modality = Optional
(** Boundary 6) of RECTANGULARREGION) (
(Boundary of REGION), (Constraint of PLACE))
ValDescs = (RECTANGLE)
Number = 1
Modality = Obligatory
has attached IData:
(Derivation TMRectangle)
NIL
(** Height 13) of RECTANGULARREGION) (
(Height of REGION))
ValDescs = (NUMBERP)
Number = 1
Modality = Optional
has attached IData:
(Derivation Copy)
[(Prerequisites Boundary)
(Arguments
  (CAR (CKLFindNode $$CONCEPT
Boundary
Height)
(** Width 11) of RECTANGULARREGION) (
(Width of REGION))
ValDescs = (NUMBERP)
Number = 1
Modality = Optional
(** Aperture 4) of HOMOGENEOUSREGION) (
(Aperture of REGION), (Constraint of PLACE))
ValDescs = (REGION)
Number = 0
Modality = Optional
(Constraint of PLACE)
ValDescs = (THING)
Number = 1
Modality = Optional
has attached IData:
(ToDraw NIL) TDDisplaySurface
(ToLocate NIL) TLDisplaySurface
(ToMake NIL) TMDisplaySurface
(ToSize NIL) TSRectangularRegion
```

[156]

WINDOW
 type: Generic
 specializes: THING
 is role value of (Window of VIEWSURFACE)

[157]

```

HOMOGENEOUSREGION
  type: Generic
  specializes: REGION, PLACE, THING
  has specializers: RECTANGULARREGION, VIEWSURFACE,
                     DISPLAYSURFACE, VISIBLESURFACE,
                     INVISIBLESURFACE
  roles:
    (** Aperture 4) ((Aperture of REGION),
                      (Constraint of PLACE))
    ValDescs = (REGION)
    Number = 0
    Modality = Optional
    (Boundary of REGION) ((Constraint of PLACE))
    ValDescs = (CLOSEDCURVE)
    Number = 1
    Modality = Optional
    has meta descriptions:
      [in Context AIPSDOMAINMETA]
        kOLE#25
          type: Individual
          individuates: ROLE
          meta-describes:
            RoleSet Boundary    in Context
AIPSDOMAINMETA
  (Height of REGION)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
  (Width of REGION)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
  (Constraint of PLACE)
  ValDescs = (THING)
  Number = 1
  Modality = Optional
  (Continuum of PLACE)
  ValDescs = (COORDINATESYSTEM)
  Number = 1
  Modality = Optional

```

[158]

LINESEGMENT#104
type: Individual

individuates: LINESEGMENT, CURVE, DISPLAYATOM,
DISPLAYFORM, DISPLAYITEM, THING
roles:
 (** IRole 292) ((EndPoint of LINESEGMENT),
 (Location of DISPLAYITEM))
 ValDescs = ((-5 0))
 has attached IData:
 (DefaultFiller NIL)
 (LIST 0 0)
 (** IRole 293) ((EndPoint of LINESEGMENT),
 (Location of DISPLAYITEM))
 ValDescs = ((5 0))
 has attached IData:
 (DefaultFiller NIL)
 (LIST 0 0)
 (Line of LINESEGMENT)
 ValDescs = (LINE)
 Number = 1
 Modality = Optional
 has attached IData:
 (Derivation DeriveLineEquationFromEndpoints)
 ((Prerequisites EndPoint))
 (Approximation of CURVE)
 ValDescs = (EDGESET)
 Number = 1
 Modality = Optional
 (Size of DISPLAYITEM)
 ValDescs = (NUMBERP)
 Number = 1
 Modality = Optional
 has attached IData:
 (DefaultFiller NIL)
 1
 (Orientation of DISPLAYITEM)
 ValDescs = (NUMBERP)
 Number = 1
 Modality = Optional
 (Width of DISPLAYITEM)
 ValDescs = (NUMBERP)
 Number = 1
 Modality = Optional
 (Height of DISPLAYITEM)
 ValDescs = (NUMBERP)
 Number = 1
 Modality = Optional
 (Envelope of DISPLAYITEM)
 ValDescs = (CLOSEDCURVE)
 Number = 1
 Modality = Optional
is role value of

((** IRole 294) of NARROWNTDSENGAGEMENTMARKABSTR)
has attached IData:
(ToDraw NIL) TDLineSegment TDCurve
(ToErase NIL) TEDisplayAtom
(ToLocate NIL) TLDisplayAtom TLDisplayItem

[159]

ROLE#98
type: Individual
individuates: ROLE, THING
meta-describes:
RoleSet Ownership in Context AIPSDOMAINMETA
is role value of

((** IRole 295) of UNKNOWNNTDSPLANEIAPL1)

[160]

STABILEDISPLAYITEM
type: Generic
specializes: DISPLAYITEM, THING
roles:
(Location of DISPLAYITEM)
ValDescs = (LISTP)
Number = 1
Modality = Optional
has attached IData:
(DefaultFiller NIL)
(LIST 0 0)
(Size of DISPLAYITEM)
ValDescs = (NUMBERP)
Number = 1
Modality = Optional
has attached IData:
(DefaultFiller NIL)
1
(Orientation of DISPLAYITEM)
ValDescs = (NUMBERP)
Number = 1
Modality = Optional
(Width of DISPLAYITEM)
ValDescs = (NUMBERP)
Number = 1
Modality = Optional
(Height of DISPLAYITEM)
ValDescs = (NUMBERP)
Number = 1
Modality = Optional
(Envelope of DISPLAYITEM)
ValDescs = (CLOSEDCURVE)
Number = 1

```
  Modality = Optional
has attached IData:
  (ToLocate NIL) TLDisplayItem
```

[161]

```
MOTILEDISPLAYITEM
  type: Generic
  specializes: DISPLAYITEM, THING
  roles:
    (Location of DISPLAYITEM)
      ValDescs = (LISTP)
      Number = 1
      Modality = Optional
      has attached IData:
        (DefaultFiller NIL)
          (LIST 0 0)
    (Size of DISPLAYITEM)
      ValDescs = (NUMBERP)
      Number = 1
      Modality = Optional
      has attached IData:
        (DefaultFiller NIL)
          1
    (Orientation of DISPLAYITEM)
      ValDescs = (NUMBERP)
      Number = 1
      Modality = Optional
    (Width of DISPLAYITEM)
      ValDescs = (NUMBERP)
      Number = 1
      Modality = Optional
    (Height of DISPLAYITEM)
      ValDescs = (NUMBERP)
      Number = 1
      Modality = Optional
    (Envelope of DISPLAYITEM)
      ValDescs = (CLOSEDCURVE)
      Number = 1
      Modality = Optional
  has attached IData:
    (ToLocate NIL) TLDisplayItem
```

[162]

```
CONCEPT#103
  type: Individual
  individuates: CONCEPT, THING
  meta-describes:
    Concept PLATFORM in Context AIPSDOMAINMETA
    is role value of
  (** IRole 296) of NTDSENGAGEMENTMARKIAPL1),
```

((** IRole 297) of
NTDSVELOCITYLEADERIAPL1)

[163]

FRIENDLYSUB
type: Generic
specializes: SUB, PLATFORM, VEHICLE, PHYSOBJECT,
 THING
roles:
 (** Ownership 13) ((Ownership of PLATFORM))
 ValDescs = (Friendly)
 Number = 1
 Modality = Optional
 (** Medium 10) of SUB) ((Medium of VEHICLE))
 ValDescs = (SubSurface)
 Number = 1
 Modality = Optional
 (EngagementStatus of PLATFORM)
 ValDescs = (ATOM)
 Number = 1
 Modality = Optional
 has meta descriptions:
 [in Context AIPSDOMAINMETA]
 ROLE#100
 type: Individual
 individuates: ROLE
 meta-describes:
 RoleSet EngagementStatus in Context
AIPSDOMAINMETA
 (Course of VEHICLE)
 ValDescs = (NUMBERP)
 Number = 1
 Modality = Optional
 has meta descriptions:
 [in Context AIPSDOMAINMETA]
 ROLE#35
 type: Individual
 individuates: ROLE
 meta-describes:
 RoleSet Course in Context AIPSDOMAINMETA
 (Speed of VEHICLE)
 ValDescs = (SPEED)
 Number = 1
 Modality = Optional
 has meta descriptions:
 [in Context AIPSDOMAINMETA]
 ROLE#44
 type: Individual
 individuates: ROLE
 meta-describes:

```
        RoleSet Speed    in Context AIPSDOMAINMETA
(Position of PHYSOBJECT)
  ValDescs = (PLACE)
  Number = 1
  Modality = Optional
(Name of PHYSOBJECT)
  ValDescs = (STRINGP)
  Number = 1
  Modality = Optional
  has meta descriptions:
    [in Context AIPSDOMAINMETA]
      ROLE#101
        type: Individual
        individuates: ROLE
        meta-describes:
          RoleSet Name    in Context AIPSDOMAINMETA
  has meta descriptions:
    [in Context AIPSDOMAINMETA]
      CONCEPT#55
        type: Individual
        individuates: CONCEPT
        meta-describes:
          Concept FRIENDLYSUB    in Context AIPSDOMAINMETA
                                      [164]

INVISIBLESURFACE
  type: Generic
  specializes: DISPLAYSURFACE, VIEWSURFACE,
                RECTANGULARREGION, HOMOGENEOUSREGION,
                REGION, PLACE, THING
  roles:
    (DisplayStream of DISPLAYSURFACE)
      ValDescs = (THING)
      Number = 1
      Modality = Obligatory
      has attached IData:
        (DefaultFiller NIL)
        (DSPCREATE)
    (Background of DISPLAYSURFACE)
      ValDescs = (SMALLP)
      Number = 1
      Modality = Obligatory
      has attached IData:
        (DefaultFiller NIL)
        0
    (** Continuum 7) of DISPLAYSURFACE) (
  (Continuum of PLACE))
    ValDescs = (VIEWSYSTEM)
    Number = 1
    Modality = Optional
```

```

(Window of VIEWSURFACE)
  ValDescs = (WINDOW)
  Number = (0 NIL)
  Modality = Optional
  (** Boundary 6) of RECTANGULARREGION) (
(Boundary of REGION), (Constraint of PLACE)
  ValDescs = (RECTANGLE)
  Number = 1
  Modality = Obligatory
  has attached IData:
    (Derivation TMRectangle)
    NIL
  (** Height 13) of RECTANGULARREGION) (
(Height of REGION))
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
  has attached IData:
    (Derivation Copy)
      [(Prerequisites Boundary)
       (Arguments
        (CAR (CKLFindNode $$CONCEPT
                           Boundary
                           Height)
      (** Width 11) of RECTANGULARREGION) (
(Width of REGION))
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
  (** Aperture 4) of HOMOGENEOUSREGION) (
(Aperture of REGION), (Constraint of PLACE))
  ValDescs = (REGION)
  Number = 0
  Modality = Optional
  (Constraint of PLACE)
  ValDescs = (THING)
  Number = 1
  Modality = Optional
  has attached IData:
    (ToDraw NIL)    TDDisplaySurface
    (ToLocate NIL)  TLDisplaySurface
    (ToMake NIL)   TMDisplaySurface
    (ToSize NIL)   TSRectangularRegion

```

[165]

RECTANGULARREGION
type: Generic

```

specializes: HOMOGENEOUSREGION, REGION, PLACE, THING
has specializers: VIEWSURFACE, DISPLAYSURFACE,
                  VISIBLESURFACE, INVISIBLESURFACE
roles:
  (** Boundary 6) ((Boundary of REGION),
                    (Constraint of PLACE))
  ValDescs = (RECTANGLE)
  Number = 1
  Modality = Obligatory
  has attached IData:
    (Derivation TMRectangle)
    NIL
  (** Continuum 8) ((Continuum of PLACE))
  ValDescs = (CARTESIANSYSTEM)
  Number = 1
  Modality = Optional
  (** Height 13) ((Height of REGION))
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
  has attached IData:
    (Derivation Copy)
      [(Prerequisites Boundary)
       (Arguments
        (CAR (CKLFindNode $$CONCEPT
                           Boundary
                           Height)
      (** Width 11) ((Width of REGION))
      ValDescs = (NUMBERP)
      Number = 1
      Modality = Optional
      (** Aperture 4) of HOMOGENEOUSREGION) (
        (Aperture of REGION), (Constraint of PLACE))
        ValDescs = (REGION)
        Number = 0
        Modality = Optional
        (Constraint of PLACE)
        ValDescs = (THING)
        Number = 1
        Modality = Optional
        has attached IData:
          (ToSize NIL)   TSRectangularRegion

```

[166]

```

EDGESET#95
type: Individual
individuates: EDGESET, DISPLAYATOM, DISPLAYFORM,
              DISPLAYITEM, THING
roles:
  (** IRole 298) ((VertexList of EDGESET))

```

```

    ValDescs = (((-5 0) (-5 5) (5 5) (5 0)))
  (Location of DISPLAYITEM)
    ValDescs = (LISTP)
    Number = 1
    Modality = Optional
    has attached IData:
      (DefaultFiller NIL)
        (LIST 0 0)
  (Size of DISPLAYITEM)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
    has attached IData:
      (DefaultFiller NIL)
        1
  (Orientation of DISPLAYITEM)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
  (Width of DISPLAYITEM)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
  (Height of DISPLAYITEM)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
  (Envelope of DISPLAYITEM)
    ValDescs = (CLOSEDCURVE)
    Number = 1
    Modality = Optional
  is role value of

  (** IRole 299) of UNKNOWNNTDSPLANEABSTR)
  has attached IData:
    (ToErase NIL) TEDisplayAtom
    (ToLocate NIL) TLDdisplayAtom TLDdisplayItem

```

[167]

```

FRIENDLYSHIP
  type: Generic
  specializes: SHIP, PLATFORM, VEHICLE, PHYSOBJECT,
    THING
  roles:
    (** Ownership 14) ((Ownership of PLATFORM))
      ValDescs = (Friendly)
      Number = 1
      Modality = Optional
    (** Medium 11) of SHIP) ((Medium of VEHICLE))
      ValDescs = (Surface)
      Number = 1

```

```
Modality = Optional
(EngagementStatus of PLATFORM)
  ValDescs = (ATOM)
  Number = 1
  Modality = Optional
  has meta descriptions:
    [in Context AIPSDOMAINMETA]
      ROLE#100
        type: Individual
        individuates: ROLE
        meta-describes:
          RoleSet EngagementStatus in Context
AIPSDOMAINMETA
  (Course of VEHICLE)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
    has meta descriptions:
      [in Context AIPSDOMAINMETA]
        ROLE#35
          type: Individual
          individuates: ROLE
          meta-describes:
            RoleSet Course in Context AIPSDOMAINMETA
  (Speed of VEHICLE)
    ValDescs = (SPEED)
    Number = 1
    Modality = Optional
    has meta descriptions:
      [in Context AIPSDOMAINMETA]
        ROLE#44
          type: Individual
          individuates: ROLE
          meta-describes:
            RoleSet Speed in Context AIPSDOMAINMETA
  (Position of PHYSOBJECT)
    ValDescs = (PLACE)
    Number = 1
    Modality = Optional
  (Name of PHYSOBJECT)
    ValDescs = (STRINGP)
    Number = 1
    Modality = Optional
    has meta descriptions:
      [in Context AIPSDOMAINMETA]
        ROLE#101
          type: Individual
          individuates: ROLE
          meta-describes:
            RoleSet Name in Context AIPSDOMAINMETA
[168]
```

```

DISPLAYCOMPOSITE
  type: Generic
  specializes: DISPLAYFORM, DISPLAYITEM, THING
  has specializers: POLYGON, REGULARPOLYGON, RECTANGLE
  roles:
    Component
      ValDescs = (DISPLAYFORM)
      Number = (1 NIL)
      Modality = Obligatory
    CoordSys
      ValDescs = (CARTESIANSYSTEM)
      Number = 1
      Modality = Optional
    (Location of DISPLAYITEM)
      ValDescs = (LISTP)
      Number = 1
      Modality = Optional
      has attached IData:
        (DefaultFiller NIL)
          (LIST 0 0)
    (Size of DISPLAYITEM)
      ValDescs = (NUMBERP)
      Number = 1
      Modality = Optional
      has attached IData:
        (DefaultFiller NIL)
          1
    (Orientation of DISPLAYITEM)
      ValDescs = (NUMBERP)
      Number = 1
      Modality = Optional
    (Width of DISPLAYITEM)
      ValDescs = (NUMBERP)
      Number = 1
      Modality = Optional
    (Height of DISPLAYITEM)
      ValDescs = (NUMBERP)
      Number = 1
      Modality = Optional
    (Envelope of DISPLAYITEM)
      ValDescs = (CLOSEDCURVE)
      Number = 1
      Modality = Optional

```

[169]

```

ROLE#94
  type: Individual
  individuates: ROLE, THING
  meta-describes:
    RoleSet Name    in Context AIPSDOMAINMETA

```

is role value of
((** IRole 300) of UNKNOWNNTDSSUBIAPL1)

[170]

ENEMYSUB
type: Generic
specializes: SUB, PLATFORM, VEHICLE, PHYSOBJECT,
THING
roles:
(** Ownership 15) ((Ownership of PLATFORM))
ValDescs = (Enemy)
Number = 1
Modality = Optional
(** Medium 10) of SUB ((Medium of VEHICLE))
ValDescs = (SubSurface)
Number = 1
Modality = Optional
(EngagementStatus of PLATFORM,
ValDescs = (ATOM)
Number = 1
Modality = Optional
has meta descriptions:
[in Context AIPSDOMAINMETA]
ROLE#100
type: Individual
individuates: ROLE
meta-describes:
RoleSet EngagementStatus in Context
AIPSDOMAINMETA
(Course of VEHICLE)
ValDescs = (NUMBERP)
Number = 1
Modality = Optional
has meta descriptions:
[in Context AIPSDOMAINMETA]
ROLE#35
type: Individual
individuates: ROLE
meta-describes:
RoleSet Course in Context AIPSDOMAINMETA
(Speed of VEHICLE)
ValDescs = (SPEED)
Number = 1
Modality = Optional
has meta descriptions:
[in Context AIPSDOMAINMETA]
ROLE#44
type: Individual
individuates: ROLE

```

meta-describes:
    RoleSet Speed    in Context AIPSDOMAINMETA
(Position of PHYSOBJECT)
    ValDescs = (PLACE)
    Number = 1
    Modality = Optional
(Name of PHYSOBJECT)
    ValDescs = (STRINGP)
    Number = 1
    Modality = Optional
has meta descriptions:
    [in Context AIPSDOMAINMETA]
    ROLE#101
        type: Individual
        individuates: ROLE
        meta-describes:
            RoleSet Name    in Context AIPSDOMAINMETA
has meta descriptions:
    [in Context AIPSDOMAINMETA]
    CONCEPT#69
        type: Individual
        individuates: CONCEPT
        meta-describes:
            Concept ENEMYSUB    in Context AIPSDOMAINMETA
                                            [171]

```

```

ROLE#100
    type: Individual
    individuates: ROLE, THING
    meta-describes:
        RoleSet EngagementStatus    in Context AIPSDOMAINMETA
    is role value of
        (** IRole 301) of UNKNOWNNTDSPLANEIAPL1),
        (** IRole 302) of
NTDSENGAGEMENTMARKIAPL1)

```

[172]

```

FRIENDLYPLANE
    type: Generic
    specializes: PLANE, PLATFORM, VEHICLE, PHYSOBJECT,
                THING
    roles:
        (** Ownership 16) ((Ownership of PLATFORM))
        ValDescs = (Friendly)
        Number = 1
        Modality = Optional
        (** Medium 12) of PLANE) ((Medium of VEHICLE))
        ValDescs = (Air)
        Number = 1

```

```
Modality = Optional
(EngagementStatus of PLATFORM)
  ValDescs = (ATOM)
  Number = 1
  Modality = Optional
  has meta descriptions:
    [in Context AIPSDOMAINMETA]
      ROLE#100
        type: Individual
        individuates: ROLE
        meta-describes:
          RoleSet EngagementStatus in Context
AIPSDOMAINMETA
  (Course of VEHICLE)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
    has meta descriptions:
      [in Context AIPSDOMAINMETA]
        ROLE#35
          type: Individual
          individuates: ROLE
          meta-describes:
            RoleSet Course in Context AIPSDOMAINMETA
  (Speed of VEHICLE)
    ValDescs = (SPEED)
    Number = 1
    Modality = Optional
    has meta descriptions:
      [in Context AIPSDOMAINMETA]
        ROLE#44
          type: Individual
          individuates: ROLE
          meta-describes:
            RoleSet Speed in Context AIPSDOMAINMETA
  (Position of PHYSOBJECT)
    ValDescs = (PLACE)
    Number = 1
    Modality = Optional
  (Name of PHYSOBJECT)
    ValDescs = (STRINGP)
    Number = 1
    Modality = Optional
    has meta descriptions:
      [in Context AIPSDOMAINMETA]
        ROLE#101
          type: Individual
          individuates: ROLE
          meta-describes:
            RoleSet Name in Context AIPSDOMAINMETA
  has meta descriptions:
```

```
[in Context AIPSDOMAINMETA]
CONCEPT#48
  type: Individual
  individuates: CONCEPT
  meta-describes:
    Concept FRIENDLYPLANE  in Context
AIPSDOMAINMETA
```

[173]

```
ROLE#93
  type: Individual
  individuates: ROLE, THING
  meta-describes:
    RoleSet EngagementStatus  in Context AIPSDOMAINMETA
  is role value of
```

```
((** IRole 303) of UNKNOWNNTDSSUBIAPL1)
```

[174]

```
ROLE#99
  type: Individual
  individuates: ROLE, THING
  meta-describes:
    RoleSet Position  in Context AIPSDOMAINMETA
  is role value of
```

```
((** IRole 304) of UNKNOWNNTDSPLANEIAPL1)
```

[175]

```
SUB
  type: Generic
  specializes: VEHICLE, PHYSOBJECT, THING
  has specializers: FRIENDLYSUB, ENEMYSUB, UNKNOWNSUB
  roles:
    (** Medium 10) ((Medium of VEHICLE))
    ValDescs = (SubSurface)
    Number = 1
    Modality = Optional
    (Course of VEHICLE)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
    has meta descriptions:
      [in Context AIPSDOMAINMETA]
      ROLE#35
        type: Individual
        individuates: ROLE
        meta-describes:
          RoleSet Course  in Context AIPSDOMAINMETA
```

```
(Speed of VEHICLE)
  ValDescs = (SPEED)
  Number = 1
  Modality = Optional
  has meta descriptions:
    [in Context AIPSDOMAINMETA]
    ROLE#44
      type: Individual
      individuates: ROLE
      meta-describes:
        RoleSet Speed  in Context AIPSDOMAINMETA
(Position of PHYSOBJECT)
  ValDescs = (PLACE)
  Number = 1
  Modality = Optional
(Name of PHYSOBJECT)
  ValDescs = (STRINGP)
  Number = 1
  Modality = Optional
  has meta descriptions:
    [in Context AIPSDOMAINMETA]
    ROLE#101
      type: Individual
      individuates: ROLE
      meta-describes:
        RoleSet Name  in Context AIPSDOMAINMETA
[176]

ROLE#92
  type: Individual
  individuates: ROLE, THING
  meta-describes:
    RoleSet Position  in Context AIPSDOMAINMETA
  is role value of

((** IRole 305) of UNKNOWNNTDSSUBIAPL1)

[177]

SHIP
  type: Generic
  specializes: VEHICLE, PHYSOBJECT, THING
  has specializers: FRIENDLYSHIP, ENEMYSHIP,
                    UNKNOWNSHIP
  roles:
    (** Medium 11) ((Medium of VEHICLE))
    ValDescs = (Surface)
    Number = 1
    Modality = Optional
(Course of VEHICLE)
  ValDescs = (NUMBERP)
```

```
Number = 1
Modality = Optional
has meta descriptions:
  [in Context AIPSDOMAINMETA]
  ROLE#35
    type: Individual
    individuates: ROLE
    meta-describes:
      RoleSet Course  in Context AIPSDOMAINMETA
(Speed of VEHICLE)
  ValDescs = (SPEED)
  Number = 1
  Modality = Optional
  has meta descriptions:
    [in Context AIPSDOMAINMETA]
    ROLE#44
      type: Individual
      individuates: ROLE
      meta-describes:
        RoleSet Speed  in Context AIPSDOMAINMETA
(Position of PHYSOBJECT)
  ValDescs = (PLACE)
  Number = 1
  Modality = Optional
  (Name of PHYSOBJECT)
  ValDescs = (STRINGP)
  Number = 1
  Modality = Optional
  has meta descriptions:
    [in Context AIPSDOMAINMETA]
    ROLE#101
      type: Individual
      individuates: ROLE
      meta-describes:
        RoleSet Name  in Context AIPSDOMAINMETA
                                         [178]
```

```
DISPLAYSURFACE
  type: Generic
  specializes: VIEWSURFACE, RECTANGULARREGION,
    HOMOGENEOUSREGION, REGION, PLACE, THING
  has specializers: VISIBLESURFACE, INVISIBLESURFACE
  roles:
    DisplayStream
    ValDescs = (THING)
    Number = 1
    Modality = Obligatory
    has attached IData:
      (DefaultFiller NIL)
        (DSPCREATE)
  Background
```

```
ValDescs = (SMALLP)
Number = 1
Modality = Obligatory
has attached IData:
  (DefaultFiller NIL)
  0
(** Continuum 7) ((Continuum of PLACE))
  ValDescs = (VIEWSYSTEM)
  Number = 1
  Modality = Optional
  (Window of VIEWSURFACE)
  ValDescs = (WINDOW)
  Number = (0 NIL)
  Modality = Optional
  ((** Boundary 6) of RECTANGULARREGION) (
(Boundary of REGION), (Constraint of PLACE))
  ValDescs = (RECTANGLE)
  Number = 1
  Modality = Obligatory
  has attached IData:
    (Derivation TMRectangle)
    NIL
  ((** Height 13) of RECTANGULARREGION) (
(Height of REGION))
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
  has attached IData:
    (Derivation Copy)
    [(Prerequisites Boundary)
     (Arguments
      (CAR (CKLFindNode $$CONCEPT
Boundary
Height)
     ((** Width 12) of RECTANGULARREGION) (
(Width of REGION))
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
  ((** Aperture 4) of HOMOGENEOUSREGION) (
(Aperture of REGION), (Constraint of PLACE))
  ValDescs = (PREGION)
  Number = 0
  Modality = Optional
  (Constraint of PLACE)
  ValDescs = (THING)
  Number = 1
```

```
    Modality = Optional
has attached IData:
  (ToDraw NIL)    TDDisplaySurface
  (ToLocate NIL)  TLDisplaySurface
  (ToMake NIL)    TMDisplaySurface
  (ToSize NIL)    TSRectangularRegion
```

[179]

PLATFORM

```
  type: Generic
  specializes: VEHICLE, PHYSOBJECT, THING
  has specializers: FRIENDLYSHIP, FRIENDLYSUB,
                     FRIENDLYPLANE, ENEMYSHIP, ENEMYSUB,
                     ENEMYPLANE, UNKNOWNSHIP, UNKNOWNSUB,
                     UNKNOWNPLANE
```

roles:

```
  EngagementStatus
    ValDescs = (ATOM)
    Number = 1
    Modality = Optional
    has meta descriptions:
      [in Context AIPSDOMAINMETA]
        ROLE#100
          type: Individual
          individuates: ROLE
          meta-describes:
            RoleSet EngagementStatus in Context
```

AIPSDOMAINMETA

```
  Ownership
    ValDescs = (ATOM)
    Number = 1
    Modality = Optional
  (Medium of VEHICLE)
    ValDescs = (ATOM)
    Number = 1
    Modality = Optional
    has meta descriptions:
      [in Context AIPSDOMAINMETA]
        ROLE#33
          type: Individual
          individuates: ROLE
          meta-describes:
            RoleSet Medium in Context AIPSDOMAINMETA
  (Course of VEHICLE)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
    has meta descriptions:
      [in Context AIPSDOMAINMETA]
        ROLE#35
          type: Individual
```

```
    individuates: ROLE
    meta-describes:
        RoleSet Course    in Context AIPSDOMAINMETA
(Speed of VEHICLE)
    ValDescs = (SPEED)
    Number = 1
    Modality = Optional
    has meta descriptions:
        [in Context AIPSDOMAINMETA]
        ROLE#44
            type: Individual
            individuates: ROLE
            meta-describes:
                RoleSet Speed    in Context AIPSDOMAINMETA
(Position of PHYSOBJECT)
    ValDescs = (PLACE)
    Number = 1
    Modality = Optional
    (Name of PHYSOBJECT)
    ValDescs = (STRINGP)
    Number = 1
    Modality = Optional
    has meta descriptions:
        [in Context AIPSDOMAINMETA]
        ROLE#101
            type: Individual
            individuates: ROLE
            meta-describes:
                RoleSet Name    in Context AIPSDOMAINMETA
has meta descriptions:
    [in Context AIPSDOMAINMETA]
    CONCEPT#103
        type: Individual
        individuates: CONCEPT
        meta-describes:
            Concept PLATFORM    in Context AIPSDOMAINMETA
[180]
```

```
ENEMYSHIP
type: Generic
specializes: SHIP, PLATFORM, VEHICLE, PHYSOBJECT,
            THING
roles:
    (** Ownership 17) ((Ownership of PLATFORM))
    ValDescs = (Enemy)
    Number = 1
    Modality = Optional
    (** Medium 11) of SHIP) ((Medium of VEHICLE))
    ValDescs = (Surface)
    Number = 1
    Modality = Optional
```

```
(EngagementStatus of PLATFORM)
  ValDescs = (ATOM)
  Number = 1
  Modality = Optional
  has meta descriptions:
    [in Context AIPSDOMAINMETA]
      ROLE#100
        type: Individual
        individuates: ROLE
        meta-describes:
          RoleSet EngagementStatus in Context
AIPSDOMAINMETA
(Course of VEHICLE)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
  has meta descriptions:
    [in Context AIPSDOMAINMETA]
      ROLE#35
        type: Individual
        individuates: ROLE
        meta-describes:
          RoleSet Course in Context AIPSDOMAINMETA
(Speed of VEHICLE)
  ValDescs = (SPEED)
  Number = 1
  Modality = Optional
  has meta descriptions:
    [in Context AIPSDOMAINMETA]
      ROLE#44
        type: Individual
        individuates: ROLE
        meta-describes:
          RoleSet Speed in Context AIPSDOMAINMETA
(Position of PHYSOBJECT)
  ValDescs = (PLACE)
  Number = 1
  Modality = Optional
  (Name of PHYSOBJECT)
  ValDescs = (STRINGP)
  Number = 1
  Modality = Optional
  has meta descriptions:
    [in Context AIPSDOMAINMETA]
      ROLE#101
        type: Individual
        individuates: ROLE
        meta-describes:
          RoleSet Name in Context AIPSDOMAINMETA
  has meta descriptions:
    [in Context AIPSDOMAINMETA]
```

```
CONCEPT#62
  type: Individual
  individuates: CONCEPT
  meta-describes:
    Concept ENEMYSHIP    in Context AIPSDOMAINMETA
                                         [181]
```

```
CONCEPT#97
  type: Individual
  individuates: CONCEPT, THING
  meta-describes:
    Concept UNKNOWNPLANE    in Context AIPSDOMAINMETA
    is role value of
```

```
((** IRole 306) of UNKNOWNNTDSPLANEIAPL1)
```

```
[182]
```

```
POINT#96
  type: Individual
  individuates: POINT, DISPLAYATOM, DISPLAYFORM,
                 DISPLAYITEM, THING
  roles:
    (** IRole 307) ((Location of DISPLAYITEM))
    ValDescs = ((0 0))
    has attached IData:
      (DefaultFiller NIL)
      (LIST 0 0)
    (Size of DISPLAYITEM)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
    has attached IData:
      (DefaultFiller NIL)
      1
    (Orientation of DISPLAYITEM)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
    (Width of DISPLAYITEM)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
    (Height of DISPLAYITEM)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
    (Envelope of DISPLAYITEM)
    ValDescs = (CLOSEDCURVE)
    Number = 1
    Modality = Optional
```

is role value of

```
((** IRole 308) of UNKNOWNNTDSPLANEABSTR)
  has attached IData:
    (ToDraw NIL)  TDPoint
    (ToErase NIL) TEDisplayAtom
    (ToLocate NIL) TLDisplayAtom TLDisplayItem
```

[183]

CONCEPT#90

```
type: Individual
individuates: CONCEPT, THING
meta-describes:
  Concept UNKNOWNSUB  in Context AIPSDOMAINMETA
is role value of
```

```
((** IRole 309) of UNKNOWNNTDSSUSIAPL1)
```

[184]

DISPLAYFORM

```
type: Generic
specializes: DISPLAYITEM, THING
has specializers: DISPLAYATOM, DISPLAYCOMPOSITE,
  POINT, EDGESET, CURVE, LINESEGMENT,
  CLOSEDCURVE, ELLIPSE, POLYGON,
  CIRCLE, REGULARPOLYGON, RECTANGLE
has individuators: POINT#39, POINT#47, POINT#54,
  POINT#61, POINT#68, POINT#75,
  POINT#82, POINT#89, POINT#96,
  EDGESET#46, EDGESET#53, EDGESET#60,
  EDGESET#67, EDGESET#74, EDGESET#81,
  EDGESET#88, EDGESET#95,
  LINESEGMENT#26, LINESEGMENT#27,
  LINESEGMENT#102, LINESEGMENT#104,
  CIRCLE#38
roles:
  (Location of DISPLAYITEM)
    ValDescs = (LISTP)
    Number = 1
    Modality = Optional
    has attached IData:
      (DefaultFiller NIL)
        (LIST 0 0)
  (Size of DISPLAYITEM)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
    has attached IData:
      (DefaultFiller NIL)
        1
```

```
(Orientation of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
(Width of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
(Height of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
(Envelope of DISPLAYITEM)
  ValDescs = (CLOSEDCURVE)
  Number = 1
  Modality = Optional
is role value of

(FixedComponent of DISPLAYITEMABSTRACTION) ,
  (Component of DISPLAYCOMPOSITE)
has attached IData:
  (ToLocate NIL) TLDisplayItem
```

[185]

```
PLANE
type: Generic
specializes: VEHICLE, PHYSOBJECT, THING
has specializers: FRIENDLYPLANE, ENEMYPLANE,
  UNKNOWNPLANE
roles:
  (** Medium 12) ((Medium of VEHICLE))
  ValDescs = (Air)
  Number = 1
  Modality = Optional
(Course of VEHICLE)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
has meta descriptions:
  [in Context AIPSDOMAINMETA]
    ROLE#35
      type: Individual
      individuates: ROLE
      meta-describes:
        RoleSet Course  in Context AIPSDOMAINMETA
(Speed of VEHICLE)
  ValDescs = (SPEED)
  Number = 1
  Modality = Optional
has meta descriptions:
  [in Context AIPSDOMAINMETA]
```

```
ROLE#44
  type: Individual
  individuates: ROLE
  meta-describes:
    RoleSet Speed  in Context AIPSDOMAINMETA
  (Position of PHYSOBJECT)
    ValDescs = (PLACE)
    Number = 1
    Modality = Optional
  (Name of PHYSOBJECT)
    ValDescs = (STRINGP)
    Number = 1
    Modality = Optional
  has meta descriptions:
    [in Context AIPSDOMAINMETA]
    ROLE#101
      type: Individual
      individuates: ROLE
      meta-describes:
        RoleSet Name  in Context AIPSDOMAINMETA
  has meta descriptions:
    [in Context AIPSDOMAINMETA]
    CONCEPT#31
      type: Individual
      individuates: CONCEPT
      meta-describes:
        Concept PLANE  in Context AIPSDOMAINMETA
```

[186]

```
EDGESET#98
  type: Individual
  individuates: EDGESET, DISPLAYATOM, DISPLAYFORM,
                DISPLAYITEM, THING
  roles:
    (** IRole 310) ((VertexList of EDGESET))
    ValDescs = (((-5 0) (-3 -5) (5 -5) (5 0)))
  (Location of DISPLAYITEM)
    ValDescs = (LISTP)
    Number = 1
    Modality = Optional
  has attached IData:
    (DefaultFiller NIL)
      (LIST 0 0)
  (Size of DISPLAYITEM)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
  has attached IData:
    (DefaultFiller NIL)
      1
  (Orientation of DISPLAYITEM)
```

```
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
    (Width of DISPLAYITEM)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
    (Height of DISPLAYITEM)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
    (Envelope of DISPLAYITEM)
    ValDescs = (CLOSEDCURVE)
    Number = 1
    Modality = Optional
  is role value of

  (** IRole 311) of UNKNOWNNTDSSUBABSTR)
  has attached IData:
    (ToErase NIL) TEDisplayAtom
    (ToLocate NIL) TLDisplayAtom TLDisplayItem
```

[187]

```
ENEMYPLANE
  type: Generic
  specializes: PLANE, PLATFORM, VEHICLE, PHYSOBJECT,
    THING
  roles:
    (** Ownership 18) ((Ownership of PLATFORM))
    ValDescs = (Enemy)
    Number = 1
    Modality = Optional
    (** Medium 12) of PLANE) ((Medium of VEHICLE))
    ValDescs = (Air)
    Number = 1
    Modality = Optional
    (EngagementStatus of PLATFORM)
    ValDescs = (ATOM)
    Number = 1
    Modality = Optional
    has meta descriptions:
      [in Context AIPSDOMAINMETA]
        ROLE#100
          type: Individual
          individuates: ROLE
          meta-describes:
            RoleSet EngagementStatus in Context
AIPSDOMAINMETA
  (Course of VEHICLE)
  ValDescs = (NUMBERP)
  Number = 1
```

Modality = Optional
has meta descriptions:
[in Context AIPSDOMAINMETA]
ROLE#35
type: Individual
individuates: ROLE
meta-describes:
 RoleSet Course in Context AIPSDOMAINMETA
(Speed of VEHICLE)
ValDescs = (SPEED)
Number = 1
Modality = Optional
has meta descriptions:
[in Context AIPSDOMAINMETA]
ROLE#44
type: Individual
individuates: ROLE
meta-describes:
 RoleSet Speed in Context AIPSDOMAINMETA
(Position of PHYSOBJECT)
ValDescs = (PLACE)
Number = 1
Modality = Optional
(Name of PHYSOBJECT)
ValDescs = (STRINGP)
Number = 1
Modality = Optional
has meta descriptions:
[in Context AIPSDOMAINMETA]
ROLE#101
type: Individual
individuates: ROLE
meta-describes:
 RoleSet Name in Context AIPSDOMAINMETA
has meta descriptions:
[in Context AIPSDOMAINMETA]
CONCEPT#76
type: Individual
individuates: CONCEPT
meta-describes:
 Concept ENEMYPLANE in Context AIPSDOMAINMETA
[188]

DISPLAYATOM
type: Generic
specializes: DISPLAYFORM, DISPLAYITEM, THING
has specializers: POINT, EDGESET, CURVE, LINESEGMENT,
CLOSEDCURVE, ELLIPSE, POLYGON,
CIRCLE, REGULARPOLYGON, RECTANGLE
has individuators: POINT#39, POINT#47, POINT#54,
POINT#61, POINT#68, POINT#75,

```

POINT#82, POINT#89, POINT#96,
EDGESET#46, EDGESET#53, EDGESET#60,
EDGESET#67, EDGESET#74, EDGESET#81,
EDGESET#88, EDGESET#95,
LINESEGMENT#26, LINESEGMENT#27,
LINESEGMENT#102, LINESEGMENT#104,
CIRCLE#38

roles:
  (Location of DISPLAYITEM)
    ValDescs = (LISTP)
    Number = 1
    Modality = Optional
    has attached IData:
      (DefaultFiller NIL)
      (LIST 0 0)
  (Size of DISPLAYITEM)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
    has attached IData:
      (DefaultFiller NIL)
      1
  (Orientation of DISPLAYITEM)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
  (Width of DISPLAYITEM)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
  (Height of DISPLAYITEM)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
  (Envelope of DISPLAYITEM)
    ValDescs = (CLOSEDCURVE)
    Number = 1
    Modality = Optional

```

[189]

```

POINT
  type: Generic
  specializes: DISPLAYATOM, DISPLAYFORM, DISPLAYITEM,
              THING
  has individuators: POINT#39, POINT#47, POINT#51,
                     POINT#61, POINT#68, POINT#75,
                     POINT#82, POINT#89, POINT#96
  roles:
    (Location of DISPLAYITEM)
      ValDescs = (LISTP)
      Number = 1

```

```

Modality = Optional
has attached IData:
  (DefaultFiller NIL)
    (LIST 0 0)
(Size of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
  has attached IData:
    (DefaultFiller NIL)
      1
(Orientation of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
(Width of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
(Height of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
(Envelope of DISPLAYITEM)
  ValDescs = (CLOSEDCURVE)
  Number = 1
  Modality = Optional
has attached IData:
  (ToDraw NIL)  TDPoint
  (ToErase NIL) TEDisplayAtom
  (ToLocate NIL) TLDisplayAtom TLDisplayItem

```

[190]

```

DISPLAY
  type: Generic
  specializes: PRESENTATION, DISPLAYITEM, THING
  has specializers: TEXT, ARRANGEMENT, MAP, MAPITEM,
    MAPGRID, NTDSENGAGEMENTMARK,
    NTDSELOCITYLEADER, ROW, COLUMN,
    TABLE, MAPLEGEND, RECTANGULARMAP,
    MAPWITHBACKGROUND, NTDSITEM,
    NARROWNTDSENGAGEMENTMARK, TEXTROW,
    TEXTCOLUMN, ROWTABLE, COLUMNTABLE,
    NTDSMAP, FRIENDLYNTDSSHIP,
    FRIENDLYNTDSPLANE, FRIENDLYNTDSSUB,
    ENEMYNTDSSHIP, ENEMYNTDSSUB,
    ENEMYNTDSPLANE, UNKNOWNNTDSSHIP,
    UNKNOWNNTDSSUB, UNKNOWNNTDSPLANE
  roles:
    (** Realization 9) ((Realization of PRESENTATION))
    ValDescs = (DISPLAYITEM)

```

```
Number = (0 NIL)
Modality = Optional
Ground
  ValDescs = (VIEWSURFACE)
  Number = 1
  Modality = Obligatory
Name
  ValDescs = (STRINGP)
  Number = 1
  Modality = Optional
(Application of PRESENTATION)
  ValDescs = (THING)
  Number = (0 NIL)
  Modality = Optional
(Location of DISPLAYITEM)
  ValDescs = (LISTP)
  Number = 1
  Modality = Optional
  has attached IData:
    (DefaultFiller NIL)
    (LIST 0 0)
(Size of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
  has attached IData:
    (DefaultFiller NIL)
    1
(Orientation of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
(Width of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
(Height of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
(Envelope of DISPLAYITEM)
  ValDescs = (CLOSEDCURVE)
  Number = 1
  Modality = Optional
is role value of ((** Item 12) of ROW),
  ((** Item 11) of COLUMN)
```

[191]

ROLE#91
type: Individual

individuates: ROLE, THING
meta-describes:
 RoleSet Ownership in Context AIPSDOMAINMETA
 is role value of
 (** IRole 312) of UNKNOWNNTDSSUBIAPL1)

[192]

ELLIPSE
 type: Generic
 specializes: CLOSEDCURVE, CURVE, DISPLAYATOM,
 DISPLAYFORM, DISPLAYITEM, THING
 has specializer: CIRCLE
 has individuator: CIRCLE#38
 roles:
 Center ((Location of DISPLAYITEM))
 ValDescs = (LISTP)
 Number = 1
 Modality = Optional
 has attached IData:
 (DefaultFiller NIL)
 (LIST 0 0)
 SemiMinorAxis ((Size of DISPLAYITEM))
 ValDescs = (NUMBERP)
 Number = 1
 Modality = Obligatory
 has attached IData:
 (DefaultFiller NIL)
 1
 SemiMajorAxis ((Size of DISPLAYITEM))
 ValDescs = (NUMBERP)
 Number = 1
 Modality = Obligatory
 has attached IData:
 (DefaultFiller NIL)
 1
 (Approximation of CURVE)
 ValDescs = (EDGESET)
 Number = 1
 Modality = Optional
 (Size of DISPLAYITEM)
 ValDescs = (NUMBERP)
 Number = 1
 Modality = Optional
 has attached IData:
 (DefaultFiller NIL)
 1
 (Orientation of DISPLAYITEM)
 ValDescs = (NUMBERP)
 Number = 1

```
    Modality = Optional
    (Width of DISPLAYITEM)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
    (Height of DISPLAYITEM)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
    (Envelope of DISPLAYITEM)
    ValDescs = (CLOSEDCURVE)
    Number = 1
    Modality = Optional
```

[193]

```
POINT#89
  type: Individual
  individuates: POINT, DISPLAYATOM, DISPLAYFORM,
                 DISPLAYITEM, THING
  roles:
    (** IRole 313) ((Location of DISPLAYITEM))
    ValDescs = ((0 0))
    has attached IData:
      (DefaultFiller NIL)
      (LIST 0 0)
    (Size of DISPLAYITEM)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
    has attached IData:
      (DefaultFiller NIL)
      1
    (Orientation of DISPLAYITEM)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
    (Width of DISPLAYITEM)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
    (Height of DISPLAYITEM)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
    (Envelope of DISPLAYITEM)
    ValDescs = (CLOSEDCURVE)
    Number = 1
    Modality = Optional
  is role value of
  (** IRole 314) of UNKNOWNNTDSSUBABSTR)
```

```
has attached IData:  
(ToDraw NIL) TDPoint  
(ToErase NIL) TEDisplayAtom  
(ToLocate NIL) TLDisplayAtom TLDisplayItem
```

[194]

CURVE

```
type: Generic  
specializes: DISPLAYATOM, DISPLAYFORM, DISPLAYITEM,  
THING  
has specializers: LINESEGMENT, CLOSEDCURVE, ELLIPSE,  
POLYGON, CIRCLE, REGULARPOLYGON,  
RECTANGLE  
has individuators: LINESEGMENT#26, LINESEGMENT#27,  
LINESEGMENT#102, LINESEGMENT#104,  
CIRCLE#38  
roles:  
  Approximation  
    ValDescs = (EDGESET)  
    Number = 1  
    Modality = Optional  
  (Location of DISPLAYITEM)  
    ValDescs = (LISTP)  
    Number = 1  
    Modality = Optional  
  has attached IData:  
    (DefaultFiller NIL)  
      (LIST 0 0)  
  (Size of DISPLAYITEM)  
    ValDescs = (NUMBERP)  
    Number = 1  
    Modality = Optional  
  has attached IData:  
    (DefaultFiller NIL)  
      1  
  (Orientation of DISPLAYITEM)  
    ValDescs = (NUMBERP)  
    Number = 1  
    Modality = Optional  
  (Width of DISPLAYITEM)  
    ValDescs = (NUMBERP)  
    Number = 1  
    Modality = Optional  
  (Height of DISPLAYITEM)  
    ValDescs = (NUMBERP)  
    Number = 1  
    Modality = Optional  
  (Envelope of DISPLAYITEM)  
    ValDescs = (CLOSEDCURVE)  
    Number = 1  
    Modality = Optional
```

is role value of (ReferenceLine of MAPGRID)

[195]

ROLE#87

type: Individual
individuates: ROLE, THING
meta-describes:
 RoleSet Name in Context AIPSDOMAINMETA
is role value of

((** IRole 315) of UNKNOWNNTDSSHIPIAPL1)

[196]

ROLE#86

type: Individual
individuates: ROLE, THING
meta-describes:
 RoleSet EngagementStatus in Context AIPSDOMAINMETA
is role value of

((** IRole 316) of UNKNOWNNTDSSHIPIAPL1)

[197]

ROLE#85

type: Individual
individuates: ROLE, THING
meta-describes:
 RoleSet Position in Context AIPSDOMAINMETA
is role value of

((** IRole 317) of UNKNOWNNTDSSHIPIAPL1)

[198]

ROLE#78

type: Individual
individuates: ROLE, THING
meta-describes:
 RoleSet Position in Context AIPSDOMAINMETA
is role value of

((** IRole 318) of ENEMYNTDSPLANEIAPL1)

[199]

ROLE#84

type: Individual
individuates: ROLE, THING

```
meta-describes:  
  RoleSet Ownership  in Context AIPSDOMAINMETA  
is role value of  
((** IRole 319) of UNKNOWNNTDSSHIPIAPL1)
```

[200]

```
CONCEPT#83  
  type: Individual  
  individuates: CONCEPT, THING  
  meta-describes:  
    Concept UNKNOWNSHIP  in Context AIPSDOMAINMETA  
  is role value of
```

```
((** IRole 320) of UNKNOWNNTDSSHIPIAPL1)
```

[201]

```
POINT#82  
  type: Individual  
  individuates: POINT, DISPLAYATOM, DISPLAYFORM,  
                DISPLAYITEM, THING  
  roles:  
    (** IRole 321) ((Location of DISPLAYITEM))  
      ValDescs = ((0 0))  
      has attached IData:  
        (DefaultFiller NIL)  
        (LIST 0 0)  
      (Size of DISPLAYITEM)  
        ValDescs = (NUMBERP)  
        Number = 1  
        Modality = Optional  
        has attached IData:  
          (DefaultFiller NIL)  
          1  
      (Orientation of DISPLAYITEM)  
        ValDescs = (NUMBERP)  
        Number = 1  
        Modality = Optional  
      (Width of DISPLAYITEM)  
        ValDescs = (NUMBERP)  
        Number = 1  
        Modality = Optional  
      (Height of DISPLAYITEM)  
        ValDescs = (NUMBERP)  
        Number = 1  
        Modality = Optional  
      (Envelope of DISPLAYITEM)  
        ValDescs = (CLOSEDCURVE)  
        Number = 1
```

```
    Modality = Optional
is role value of

((** IRole 322) of UNKNOWNNTDSSHIPABSTR)
has attached IData:
  (ToDraw NIL)  TDPoint
  (ToErase NIL)  TEDisplayAtom
  (ToLocate NIL)  TLDisplayAtom  TLDisplayItem
                                         [202]

EDGESET#81
  type: Individual
  individuates: EDGESET, DISPLAYATOM, DISPLAYFORM,
                 DISPLAYITEM, THING
  roles:
    (** IRole 323) ((VertexList of EDGESET))
    ValDescs = (
      ((-5 -5) (-5 5) (5 5) (5 -5) (-5 -5)))
    (** IRole 324) ((Location of DISPLAYITEM))
    ValDescs = ((0 0))
    has attached IData:
      (DefaultFiller NIL)
      (LIST 0 0)
    (Size of DISPLAYITEM)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
    has attached IData:
      (DefaultFiller NIL)
      1
    (Orientation of DISPLAYITEM)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
    (Width of DISPLAYITEM)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
    (Height of DISPLAYITEM)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
    (Envelope of DISPLAYITEM)
    ValDescs = (CLOSEDCURVE)
    Number = 1
    Modality = Optional
  is role value of

((** IRole 325) of UNKNOWNNTDSSHIPABSTR)
has attached IData:
  (ToErase NIL)  TEDisplayAtom
```

(ToLocate NIL) TLDisplayAtom TLDisplayItem

[203]

ROLE#80
type: Individual
individuates: ROLE, THING
meta-describes:
 RoleSet Name in Context AIPSDOMAINMETA
is role value of

((** IRole 326) of ENEMYNTDSPLANEIAPL1)

[204]

ROLE#73
type: Individual
individuates: ROLE, THING
meta-describes:
 RoleSet Name in Context AIPSDOMAINMETA
is role value of

((** IRole 327) of ENEMYNTDSSUBIAPL1)

[205]

ROLE#79
type: Individual
individuates: ROLE, THING
meta-describes:
 RoleSet EngagementStatus in Context AIPSDOMAINMETA
is role value of

((** IRole 328) of ENEMYNTDSPLANEIAPL1)

[206]

UNKNOWNNTDSPLANEIAPL1
type: Individual
individuates: TEMPLATE, THING
roles:
 (** IRole 306) ((ConceptGroup of TEMPLATE))
 ValDescs = (CONCEPT#97)
 (** IRole 295) ((RoleGroup of TEMPLATE))
 ValDescs = (ROLE#98)
 (** IRole 329) ((RoleGroup of TEMPLATE))
 ValDescs = (ROLE#33)
 (** IRole 304) ((RoleGroup of TEMPLATE))
 ValDescs = (ROLE#99)
 (** IRole 301) ((RoleGroup of TEMPLATE))
 ValDescs = (ROLE#100)
 (** IRole 262) ((RoleGroup of TEMPLATE))

```
    ValDescs = (ROLE#35)
(** IRole 330) ((RoleGroup of TEMPLATE))
    ValDescs = (ROLE#44)
(** IRole 291) ((RoleGroup of TEMPLATE))
    ValDescs = (ROLE#101)
is role value of
((** IRole 331) of UNKNOWNNTOSPLANEABSTR)
```

[207]

```
UNKNOWNNTDSSUBIAPI1
type: Individual
individuates: TEMPLATE, THING
roles:
(** IRole 309) ((ConceptGroup of TEMPLATE))
    ValDescs = (CONCEPT#90)
(** IRole 312) ((RoleGroup of TEMPLATE))
    ValDescs = (ROLE#91)
(** IRole 267) ((RoleGroup of TEMPLATE))
    ValDescs = (ROLE#33)
(** IRole 305) ((RoleGroup of TEMPLATE))
    ValDescs = (ROLE#92)
(** IRole 303) ((RoleGroup of TEMPLATE))
    ValDescs = (ROLE#93)
(** IRole 332) ((RoleGroup of TEMPLATE))
    ValDescs = (ROLE#35)
(** IRole 333) ((RoleGroup of TEMPLATE))
    ValDescs = (ROLE#44)
(** IRole 334) ((RoleGroup of TEMPLATE))
    ValDescs = (ROLE#94)
is role value of
((** IRole 335) of UNKNOWNNTDSSUBABSTR)
```

[208]

```
ROW
type: Generic
specializes: ARRANGEMENT, DISPLAY, PRESENTATION,
DISPLAYITEM, THING
has specializers: TEXTROW, COLUMNTABLE
roles:
(** Item 12) ((Item of ARRANGEMENT),
    (Realization of PRESENTATION))
    ValDescs = (DISPLAY)
    Number = (2 NIL)
    Modality = Obligatory
(** Height 14) ((Height of DISPLAYITEM))
    ValDescs = (NUMBERP)
    Number = 1
```

```
    Modality = Optional
  (ItemOrder of ARRANGEMENT)
    ValDescs = (LISTP)
    Number = 1
    Modality = Optional
  (Border of ARRANGEMENT) (


  (Realization of PRESENTATION))
    ValDescs = (CLOSEDCURVE)
    Number = 1
    Modality = Optional
  (Separator of ARRANGEMENT) (


  (Realization of PRESENTATION))
    ValDescs = (DISPLAYITEM)
    Number = (0 NIL)
    Modality = Optional
  (** Realization 9) of DISPLAY) (


  (Realization of PRESENTATION))
    ValDescs = (DISPLAYITEM)
    Number = (0 NIL)
    Modality = Optional
  (Ground of DISPLAY)
    ValDescs = (VIEWSURFACE)
    Number = 1
    Modality = Obligatory
  (Name of DISPLAY)
    ValDescs = (STRINGP)
    Number = 1
    Modality = Optional
  (Application of PRESENTATION)
    ValDescs = (THING)
    Number = (0 NIL)
    Modality = Optional
  (Location of DISPLAYITEM)
    ValDescs = (LISTP)
    Number = 1
    Modality = Optional
    has attached IData:
      (DefaultFiller NIL)
        (LIST 0 0)
  (Size of DISPLAYITEM)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
    has attached IData:
      (DefaultFiller NIL)
        1
  (Orientation of DISPLAYITEM)
    ValDescs = (NUMBERP)
```

```
Number = 1
Modality = Optional
(Width of DISPLAYITEM)
ValDescs = (NUMBERP)
Number = 1
Modality = Optional
(Envelope of DISPLAYITEM)
ValDescs = (CLOSEDCURVE)
Number = 1
Modality = Optional
```

[209]

```
UNKNOWNNTDSSUBABSTR
type: Individual
individuates: DISPLAYABSTRACTION,
              DISPLAYITEMABSTRACTION, ABSTRACTION,
              THING
has schema: UNKNOWNNTDSSUB
roles:
  (** IRole 335) (
    (IntendedApplication of DISPLAYABSTRACTION)
      ValDescs = (UNKNOWNNTDSSUBIAPI1)
      ** IRole 311) (
    (FixedComponent of DISPLAYITEMABSTRACTION)
      ValDescs = (EDGESET#88)
      ** IRole 314) (
    (FixedComponent of DISPLAYITEMABSTRACTION)
      ValDescs = (POINT#89)
    (InformationRequirement of DISPLAYABSTRACTION)
      ValDescs = (TEMPLATE)
      Number = (1 NIL)
      Modality = Optional
```

[210]

```
UNKNOWNNTDSSHIPIAPL1
type: Individual
individuates: TEMPLATE, THING
roles:
  (** IRole 320) ((ConceptGroup of TEMPLATE))
    ValDescs = (CONCEPT#83)
  (** IRole 319) ((RoleGroup of TEMPLATE))
    ValDescs = (ROLE#84)
  (** IRole 336) ((RoleGroup of TEMPLATE))
    ValDescs = (ROLE#33)
  (** IRole 317) ((RoleGroup of TEMPLATE))
    ValDescs = (ROLE#85)
  (** IRole 316) ((RoleGroup of TEMPLATE))
    ValDescs = (ROLE#86)
```

```
(** IRole 260) ((RoleGroup of TEMPLATE))
  ValDescs = (ROLE#35)
(** IRole 337) ((RoleGroup of TEMPLATE))
  ValDescs = (ROLE#44)
(** IRole 315) ((RoleGroup of TEMPLATE))
  ValDescs = (ROLE#87)
  is role value of

  ((** IRole 338) of UNKNOWNNTDSHIPABSTR)
```

[211]

```
ROLE#77
  type: Individual
  individuates: ROLE, THING
  meta-describes:
    RoleSet Ownership in Context AIPSDOMAINMETA
  is role value of

  ((** IRole 88) of ENEMYNTDSPLANEIAPL1)
```

[212]

```
ROLE#70
  type: Individual
  individuates: ROLE, THING
  meta-describes:
    RoleSet Ownership in Context AIPSDOMAINMETA
  is role value of

  ((** IRole 339) of ENEMYNTDSSUBIAPL1)
```

[213]

```
CONCEPT#76
  type: Individual
  individuates: CONCEPT, THING
  meta-describes:
    Concept ENEMYPLANE in Context AIPSDOMAINMETA
  is role value of

  ((** IRole 340) of ENEMYNTDSPLANEIAPL1)
```

[214]

```
POINT#75
  type: Individual
  individuates: POINT, DISPLAYATOM, DISPLAYFORM,
                DISPLAYITEM, THING
  roles:
    (** IRole 183) ((Location of DISPLAYITEM))
```

```
    ValDescs = ((0 0))
    has attached IData:
        (DefaultFiller NIL)
            (LIST 0 0)
    (Size of DISPLAYITEM)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
    has attached IData:
        (DefaultFiller NIL)
            1
    (Orientation of DISPLAYITEM)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
    (Width of DISPLAYITEM)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
    (Height of DISPLAYITEM)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
    (Envelope of DISPLAYITEM)
    ValDescs = (CLOSEDCURVE)
    Number = 1
    Modality = Optional
is role value of

(** IRole 341) of ENEMYNTDSPLANEABSTR)
has attached IData:
    (ToDraw NIL)    TDPoint
    (ToErase NIL)   TEDisplayAtom
    (ToLocate NIL)  TLDisplayAtom TLDisplayItem
```

[215]

```
NTDSVELOCITYLEADERIAPL1
type: Individual
individuates: TEMPLATE, THING
roles:
    (** IRole 297) ((ConceptGroup of TEMPLATE))
    ValDescs = (CONCEPT#103)
    (** IRole 342) ((RoleGroup of TEMPLATE))
    ValDescs = (ROLE#35)
    (** IRole 226) ((RoleGroup of TEMPLATE))
    ValDescs = (ROLE#44)
is role value of

(** IRole 343) of NTDSVELOCITYLEADERABSTR)
```

[216]

EDGESET#74
type: Individual
individuates: EDGESET, DISPLAYATOM, DISPLAYFORM,
DISPLAYITEM, THING
roles:
(** IRole 187) ((VertexList of EDGESET))
ValDescs = ((((-6 0) (0 6) (6 0)))
(Location of DISPLAYITEM)
ValDescs = (LISTP)
Number = 1
Modality = Optional
has attached IData:
(DefaultFiller NIL)
(LIST 0 0)
(Size of DISPLAYITEM)
ValDescs = (NUMBERP)
Number = 1
Modality = Optional
has attached IData:
(DefaultFiller NIL)
1
(Orientation of DISPLAYITEM)
ValDescs = (NUMBERP)
Number = 1
Modality = Optional
(Width of DISPLAYITEM)
ValDescs = (NUMBERP)
Number = 1
Modality = Optional
(Height of DISPLAYITEM)
ValDescs = (NUMBERP)
Number = 1
Modality = Optional
(Envelope of DISPLAYITEM)
ValDescs = (CLOSEDCURVE)
Number = 1
Modality = Optional
is role value of
(** IRole 344) of ENEMYNTDSPLANEABSTR)
has attached IData:
(ToErase NIL) TEDisplayAtom
(ToLocate NIL) TLDdisplayAtom TLDdisplayItem

[217]

POINT#68
type: Individual
individuates: POINT, DISPLAYATOM, DISPLAYFORM,
DISPLAYITEM, THING
roles:

```
(** IRole 345) ((Location of DISPLAYITEM))
  ValDescs = ((0 0))
  has attached IData:
    (DefaultFiller NIL)
      (LIST 0 0)
(Size of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
  has attached IData:
    (DefaultFiller NIL)
      1
(Orientation of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
(Width of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
(Height of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
(Envelope of DISPLAYITEM)
  ValDescs = (CLOSEDCURVE)
  Number = 1
  Modality = Optional
is role value of ((** IRole 85) of ENEMYNTDSSUBABSTR)
has attached IData:
  (ToDraw NIL)  TDPoint
  (ToErase NIL)  TEDisplayAtom
  (ToLocate NIL)  TLDisplayAtom TLDisplayItem
```

[218]

```
UNKNOWNNTDSSHIPABSTR
  type: Individual
  individuates: DISPLAYABSTRACTION,
                 DISPLAYITEMABSTRACTION, ABSTRACTION,
                 THING
  roles:
    (** IRole 338) (
      (IntendedApplication of DISPLAYABSTRACTION))
        ValDescs = (UNKNOWNNTDSSHIPAPI)
        (** IRole 325) (
          (FixedComponent of DISPLAYITEMABSTRACTION))
            ValDescs = (EDGESET#81)
            (** IRole 322) (
```

```
(FixedComponent of DISPLAYITEMABSTRACTION)
  ValDescs = (POINT#82)
(InformationRequirement of DISPLAYABSTRACTION)
  ValDescs = (TEMPLATE)
  Number = (1 NIL)
  Modality = Optional
```

[219]

```
NTDSVELOCITYLEADERABSTR
  type: Individual
  individuates: DISPLAYABSTRACTION,
                 DISPLAYITEMABSTRACTION, ABSTRACTION,
                 THING
  has schema: NTDSVELOCITYLEADER
  roles:
    (** IRole 343) (
      IntendedApplication of DISPLAYABSTRACTION)
        ValDescs = (NTDSVELOCITYLEADERIAPL1)
      (InformationRequirement of DISPLAYABSTRACTION)
        ValDescs = (TEMPLATE)
        Number = (1 NIL)
        Modality = Optional
      (FixedComponent of DISPLAYITEMABSTRACTION)
        ValDescs = (DISPLAYFORM)
        Number = (1 NIL)
        Modality = Optional
```

[220]

```
LINE
  type: Generic
  specializes: THING
  is role value of (Line of LINESEGMENT)
```

[221]

```
UNKNOWNNTDSPLANEABSTR
  type: Individual
  individuates: DISPLAYABSTRACTION,
                 DISPLAYITEMABSTRACTION, ABSTRACTION,
                 THING
  roles:
    (** IRole 331) (
      IntendedApplication of DISPLAYABSTRACTION)
        ValDescs = (UNKNOWNNTDSPLANEIAPL1)
        (** IRole 299) (
          FixedComponent of DISPLAYITEMABSTRACTION)
            ValDescs = (EDGESET#95)
            (** IRole 308) (
```

```
(FixedComponent of DISPLAYITEMABSTRACTION))
  ValDescs = (POINT#96)
  (InformationRequirement of DISPLAYABSTRACTION)
    ValDescs = (TEMPLATE)
    Number = (1 NIL)
    Modality = Optional
```

[222]

```
ROLE#72
  type: Individual
  individuates: ROLE, THING
  meta-describes:
    RoleSet EngagementStatus in Context AIPSDOMAINMETA
  is role value of ((** IRole 72) of ENEMYNTDSSUBIAPL1)
```

[223]

```
POSITION
  type: Generic
  specializes: PLACE, THING
  roles:
    Location ((Constraint of PLACE))
      ValDescs = (LISTP)
      Number = 1
      Modality = Optional
    (Continuum of PLACE)
      ValDescs = (COORDINATESYSTEM)
      Number = 1
      Modality = Optional
```

[224]

```
ROLE#71
  type: Individual
  individuates: ROLE, THING
  meta-describes:
    RoleSet Position in Context AIPSDOMAINMETA
  is role value of
  ((** IRole 346) of ENEMYNTDSSUBIAPL1)
```

[225]

```
UNKNOWNNTDSPLANE
  type: Generic
  specializes: NTDSITEM, MAPITEM, DISPLAY, PRESENTATION,
    DISPLAYITEM, THING
  has abstraction: UNKNOWNNTDSPLANEABSTR
  roles:
    (** EngagementMark 10) (
```

```
(EngagementMark of NTDSITEM) ,
  (Realization of PRESENTATION))
  ValDescs = (NARROWNTDSENGAGEMENTMARK)
  Number = 1
  Modality = Optional
  has attached IData:
    (Derivation MakeNTDSEngagementMark?)
      [(Prerequisites Application Ground)
       (Arguments
        (CAR (CKLFindNode $$CONCEPT
                           Application)))
       (CAR (CKLFindNode $$CONCEPT
                           Ground))]

  ((** Application 9) of NTDSITEM) (

  (Application of PRESENTATION))
  ValDescs = (THING)
  Number = (0 NIL)
  Modality = Optional
  has attached IData:
    (Derivation Consequents)
      (EngagementMark VelocityLeader
                           GroupStrengthMarker)
  (VelocityLeader of NTDSITEM) (
    (Realization of PRESENTATION))
    ValDescs = (NTDSVELOCITYLEADER)
    Number = 1
    Modality = Optional
  (GroupStrengthMarker of NTDSITEM) (
    (Realization of PRESENTATION))
    ValDescs = (NTDSSTRENGTHMARK, DISPLAYITEM)
    Number = 1
    Modality = Optional
    has attached IData:
      (Derivation MakeNTDSGroupStrengthMark?)
        [(Prerequisites Application)
         (Arguments (CKLFindNode $$CONCEPT
                           Application))]

  (Label of MAPITEM) ((Realization of PRESENTATION))
  ValDescs = (TEXT)
  Number = 1
  Modality = Optional
  has attached IData:
    (Derivation MakeMapItemLabel?)
      [(Prerequisites Application Ground)
       (Arguments
        (CAR (CKLFindNode $$CONCEPT
                           Application)))
       (CAR (CKLFindNode $$CONCEPT
```

Ground]

```
(FillWhenMade NIL)
  T
((** Realization 9) of DISPLAY) (
  (Realization of PRESENTATION)
    ValDescs = (DISPLAYITEM)
    Number = (0 NIL)
    Modality = Optional
  (Ground of DISPLAY)
    ValDescs = (VIEWSURFACE)
    Number = 1
    Modality = Obligatory
  (Name of DISPLAY)
    ValDescs = (STRINGP)
    Number = 1
    Modality = Optional
  (Location of DISPLAYITEM)
    ValDescs = (LISTP)
    Number = 1
    Modality = Optional
    has attached IData:
      (DefaultFiller NIL)
        (LIST 0 0)
  (Size of DISPLAYITEM)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
    has attached IData:
      (DefaultFiller NIL)
        1
  (Orientation of DISPLAYITEM)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
  (Width of DISPLAYITEM)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
  (Height of DISPLAYITEM)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
  (Envelope of DISPLAYITEM)
    ValDescs = (CLOSEDCURVE)
    Number = 1
    Modality = Optional
  is role value of (UnknownPlaneSym of NTDSMAP)
  has attached IData:
    (ToDraw NIL) TDDisplay
    (ToLocate NIL) TLDisplay TLDisplayItem
```

[226]

```

REGION
  type: Generic
  specializes: PLACE, THING
  has specializers: HOMOGENEOUSREGION,
                     RECTANGULARREGION, VIEWSURFACE,
                     DISPLAYSURFACE, VISIBLESURFACE,
                     INVISIBLESURFACE
  roles:
    Boundary ((Constraint of PLACE))
      ValDescs = (CLOSEDCURVE)
      Number = 1
      Modality = Optional
      has meta descriptions:
        [in Context AIPSDOMAINMETA]
        ROLE#25
          type: Individual
          individuates: ROLE
          meta-describes:
            RoleSet Boundary in Context
AIPSDOMAINMETA
  Aperture ((Constraint of PLACE))
    ValDescs = (REGION)
    Number = (0 NIL)
    Modality = Optional
  Height
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
  Width
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
  (Constraint of PLACE)
    ValDescs = (THING)
    Number = 1
    Modality = Optional
  (Continuum of PLACE)
    ValDescs = (COORDINATESYSTEM)
    Number = 1
    Modality = Optional
  is role value of (Aperture of REGION)

```

[227]

```

UNKNOWNNTDSSUB
  type: Generic
  specializes: NTDSITEM, MAPITEM, DISPLAY, PRESENTATION,
               DISPLAYITEM, THING
  roles:

```

```
(** EngagementMark 11) (
  (EngagementMark of NTDSITEM),
    (Realization of PRESENTATION)
    ValDescs = (NARROWNTDSENGAGEMENTMARK)
    Number = 1
    Modality = Optional
    has attached IData:
      (Derivation MakeNTDSEngagementMark?)
        [(Prerequisites Application Ground)
         (Arguments
          (CAR (CKLFindNode $$CONCEPT
                           Application))
          (CAR (CKLFindNode $$CONCEPT
                           Ground)))]
  ((** Application 9) of NTDSITEM) (
  (Application of PRESENTATION)
    ValDescs = (THING)
    Number = (0 NIL)
    Modality = Optional
    has attached IData:
      (Derivation Consequents)
        (EngagementMark VelocityLeader
                           GroupStrengthMarker)
  (VelocityLeader of NTDSITEM) (
  (Realization of PRESENTATION)
    ValDescs = (NTDSVELOCITYLEADER)
    Number = 1
    Modality = Optional
  (GroupStrengthMarker of NTDSITEM) (
  (Realization of PRESENTATION)
    ValDescs = (NTDSSTRENGTHMARK, DISPLAYITEM)
    Number = 1
    Modality = Optional
    has attached IData:
      (Derivation MakeNTDSGroupStrengthMark?)
        [(Prerequisites Application)
         (Arguments (CKLFindNode $$CONCEPT
                           Application)))]
  (Label of MAPITEM) ((Realization of PRESENTATION))
    ValDescs = (TEXT)
    Number = 1
    Modality = Optional
    has attached IData:
      (Derivation MakeMapItemLabel?)
        [(Prerequisites Application Ground)
         (Arguments
          (CAR (CKLFindNode $$CONCEPT
```

```
Application))
(CAR (CKLFindNode $$CONCEPT
Ground)
(FillWhenMade NIL)
T
((** Realization 9) of DISPLAY) (
(Realization of PRESENTATION)
  ValDescs = (DISPLAYITEM)
  Number = (0 NIL)
  Modality = Optional
  (Ground of DISPLAY)
    ValDescs = (VIEWSURFACE)
    Number = 1
    Modality = Obligatory
  (Name of DISPLAY)
    ValDescs = (STRINGP)
    Number = 1
    Modality = Optional
  (Location of DISPLAYITEM)
    ValDescs = (LISTP)
    Number = 1
    Modality = Optional
    has attached IData:
      (DefaultFiller NIL)
        (LIST 0 0)
  (Size of DISPLAYITEM)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
    has attached IData:
      (DefaultFiller NIL)
        1
  (Orientation of DISPLAYITEM)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
  (Width of DISPLAYITEM)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
  (Height of DISPLAYITEM)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
  (Envelope of DISPLAYITEM)
    ValDescs = (CLOSEDCURVE)
    Number = 1
    Modality = Optional
  is role value of (UnknownSubSym of NTDSMAP)
  has attached IData:
```

```
(ToDraw NIL)    TDDisplay
(ToLocate NIL)  TLDisplay TLDisplayItem
```

[228]

```
ROLE#63
  type: Individual
  individuates: ROLE, THING
  meta-describes:
    RoleSet Ownership  in Context AIPSDOMAINMETA
    is role value of
  (** IRole 79) of ENEMYNTDSSHIPIAPL1)
```

[229]

```
CONCEPT#69
  type: Individual
  individuates: CONCEPT, THING
  meta-describes:
    Concept ENEMYSUB  in Context AIPSDOMAINMETA
    is role value of (** IRole 68) of ENEMYNTDSSUBIAPL1)
```

[230]

```
UNKNOWNNTDSSHIP
  type: Generic
  specializes: NTDSITEM, MAPITEM, DISPLAY, PRESENTATION,
               DISPLAYITEM, THING
  roles:
    (** EngagementMark 12) (
      EngagementMark of NTDSITEM),
      (Realization of PRESENTATION)
      ValDescs = (NARROWNTDSENGAGEMENTMARK)
      Number = 1
      Modality = Optional
      has attached IData:
        (Derivation MakeNTDSEngagementMark?)
        [(Prerequisites Application Ground)
         (Arguments
          (CAR (CKLFindNode $$CONCEPT
                           Application))
          (CAR (CKLFindNode $$CONCEPT
                           Ground))
        )
      (** Application 9) of NTDSITEM)
      (Application of PRESENTATION)
      ValDescs = (THING)
      Number = (0 NIL)
      Modality = Optional
      has attached IData:
```

```
(Derivation Consequents)
  (EngagementMark VelocityLeader
    GroupStrengthMarker)
  (VelocityLeader of NTDSITEM) (
    (Realization of PRESENTATION)
      ValDescs = (NTDSVELOCITYLEADER)
      Number = 1
      Modality = Optional
      (GroupStrengthMarker of NTDSITEM) (
        (Realization of PRESENTATION)
          ValDescs = (NTDSSTRENGTHMARK, DISPLAYITEM)
          Number = 1
          Modality = Optional
          has attached IData:
            (Derivation MakeNTDSGroupStrengthMark?)
              ((Prerequisites Application)
                (Arguments (CKLFindNode $$CONCEPT
                  Application)))
            (Label of MAPITEM) ((Realization of PRESENTATION))
              ValDescs = (TEXT)
              Number = 1
              Modality = Optional
              has attached IData:
                (Derivation MakeMapItemLabel?)
                  [(Prerequisites Application Ground)
                    (Arguments
                      (CAR (CKLFindNode $$CONCEPT
                        Application))
                      (CAR (CKLFindNode $$CONCEPT
                        Ground))
                    )
                  ]
                (FillWhenMade NIL)
                T
              ((** Realization 9) of DISPLAY) (
                (Realization of PRESENTATION)
                  ValDescs = (DISPLAYITEM)
                  Number = (0 NIL)
                  Modality = Optional
                  (Ground of DISPLAY)
                    ValDescs = (VIEWSURFACE)
                    Number = 1
                    Modality = Obligatory
                  (Name of DISPLAY)
                    ValDescs = (STRINGP)
                    Number = 1
                    Modality = Optional
                  (Location of DISPLAYITEM)
                    ValDescs = (LISTP)
                    Number = 1
```

```
Modality = Optional
has attached IData:
  (DefaultFiller NIL)
    (LIST 0 0)
(Size of DISPLAYITEM)
ValDescs = (NUMBERP)
Number = 1
Modality = Optional
has attached IData:
  (DefaultFiller NIL)
  1
(Orientation of DISPLAYITEM)
ValDescs = (NUMBERP)
Number = 1
Modality = Optional
(Width of DISPLAYITEM)
ValDescs = (NUMBERP)
Number = 1
Modality = Optional
(Height of DISPLAYITEM)
ValDescs = (NUMBERP)
Number = 1
Modality = Optional
(Envelope of DISPLAYITEM)
ValDescs = (CLOSEDCURVE)
Number = 1
Modality = Optional
is role value of (UnknownShipSym of NTDSMAP)
has attached IData:
  (ToDraw NIL)  TDDisplay
  (ToLocate NIL)  TLDisplay TLDisplayItem
```

[231]

```
ROLE#56
type: Individual
individuates: ROLE, THING
meta-describes:
  RoleSet Ownership  in Context AIPSDOMAINMETA
is role value of
(** IRole 347) of FRIENDLYNTDSSUBIAPL1)
```

[232]

```
CONCEPT#62
type: Individual
individuates: CONCEPT, THING
meta-describes:
  Concept ENEMYSHIP  in Context AIPSDOMAINMETA
is role value of
```

((** IRole 78) of ENEMYNTDSSHIPIAPL1)

[233]

EDGESET#67
type: Individual
individuates: EDGESET, DISPLAYATOM, DISPLAYFORM,
DISPLAYITEM, THING
roles:
(** IRole 192) ((VertexList of EDGESET))
ValDescs = (((-6 0) (-6 -6) (6 0)))
(Location of DISPLAYITEM)
ValDescs = (LISTP)
Number = 1
Modality = Optional
has attached IData:
(DefaultFiller NIL)
(LIST 0 0)
(Size of DISPLAYITEM)
ValDescs = (NUMBERP)
Number = 1
Modality = Optional
has attached IData:
(DefaultFiller NIL)
1
(Orientation of DISPLAYITEM)
ValDescs = (NUMBERP)
Number = 1
Modality = Optional
(Width of DISPLAYITEM)
ValDescs = (NUMBERP)
Number = 1
Modality = Optional
(Height of DISPLAYITEM)
ValDescs = (NUMBERP)
Number = 1
Modality = Optional
(Envelope of DISPLAYITEM)
ValDescs = (CLOSEDCURVE)
Number = 1
Modality = Optional
is role value of ((** IRole 84) of ENEMYNTDSSUBABSTR)
has attached IData:
(ToErase NIL) TEDisplayAtom
(ToLocate NIL) TLDisplayAtom TLDisplayItem